	L #	Hits	Search Text	DBs	Time Stamp
1	L1	1916	chitinase$1	USPAT; US-PGPUB	2003/09/30 11:44
2	L2	45075	drug same (deliver$ or release or implant)	USPAT; US-PGPUB	2003/09/30 11:45
3	L3	12	1 same 2	USPAT; US-PGPUB	2003/09/30 11:51
4	L4	2	5496934.pn. or 4933185.pn.	USPAT; US-PGPUB	2003/09/30 11:51

PGPUB-DOCUMENT-NUMBER: 20030144198

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20030144198 A1

TITLE: Coadministration of transport protein with conjugated cobalamin to deliver agents

PUBLICATION-DATE: July 31, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Collins, Douglas A.	Rochester	MN	US	

APPL-NO: 10/ 262318

DATE FILED: September 30, 2002

RELATED-US-APPL-DATA:

non-provisional-of-provisional 60326183 20010928 US

US-CL-CURRENT: 514/12, 514/52 , 530/350

ABSTRACT:

Cobalamin transport proteins are administered in combination with cobalamin coupled to a diagnostic or pharmaceutically active agents to increase the extent of absorption of the diagnostic or pharmaceutically active agent. Cobalamin transport proteins include, but are not limited to intrinsic factor, transcobalamin I, transcobalamin II and transcobalamin III. The combination of the cobalamin or cobalamin derivative with the cobalamin transport protein provides enhanced cellular uptake.

---------- KWIC ---------

Summary of Invention Paragraph - BSTX (295):

[0291] Several methods have been developed to reversibly encapsulate biologically active substances. One that can be applied both to in vitro and in vivo studies has been described in U.S. Pat. No. 4,900,556 by Wheatley et al. entitled "System for Delayed and Pulsed **Release** of Biologically-Active Substances." In this disclosed system, the biologically-active substance can be released either at a constant rate over a period of time or in discrete pulses. The biologically active materials are entrapped within--liposomes encapsulated within semipermeable microcapsules or permeable polymeric matrix. **Release** of the desired materials is governed by the permeability of both the liposome and the surrounding matrix (the matrix integrity is directly proportional to the liposome integrity); the permeability of the liposome can be engineered by

modifying the composition and the method for making the liposome to produce liposome that are sensitive to specific stimuli such as temperature, pH or light. For example, by including a phospholipase that degrades the liposome within some or all of the liposomes or the surrounding matrix, the liposome can be destabilized and broken down over a period of time. Other systems have been developed, e.g. U.S. Pat. No. 4,933,185 by Wheatley et al., which utilize a core made up of a polymer (such as an ionically cross-linked polysaccharide with calcium alginate or chitin) around which there is an ionically bound skin (such as a polycationic skin of poly-L-lysine) whose integrity is dependent on the core polymer. With an impermeable skin, when the core polymer can be degraded by enzymes (such as alginase from the bacteria, **chitinase** or hydrolase), there is a sudden **release** of biologically active substance from the core. Alternatively, the skin can be partially permeable for a gradual **release of drug** upon degradation of the core.

PGPUB-DOCUMENT-NUMBER: 20020151525

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020151525 A1

TITLE: Transcobalamin receptor binding conjugates useful for treating abnormal cellular proliferation

PUBLICATION-DATE: October 17, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Collins, Douglas A.	Rochester	MN	US	
Hogenkamp, Henricus P.C.	Roseville	MN	US	

APPL-NO: 10/ 027593

DATE FILED: October 25, 2001

RELATED-US-APPL-DATA:

non-provisional-of-provisional 60243082 20001025 US

non-provisional-of-provisional 60243112 20001025 US

US-CL-CURRENT: 514/80, 540/145

ABSTRACT:

An agent, composition and method for the treatment, prophylaxis and/or diagnosis of proliferative disorders, which is highly and efficiently absorbed at the site of abnormal cellular proliferation is disclosed.

[0001] This application claims priority to U.S. provisional application no. 60/243,082 and U.S. provisional application no. 60/243,112, both filed on Oct. 25, 2000.

---------- KWIC ---------

Detail Description Paragraph - DETX (241):

[0372] Several methods have been developed to reversibly encapsulate biologically active substances. One that can be applied both to in vitro and in vivo studies has been described in U.S. Pat. No. 4,900,556 by Wheatley et al. entitled "System for Delayed and Pulsed **Release** of Biologically-Active Substances." In this disclosed system, the biologically-active substance can be released either at a constant rate over a period of time or in discrete pulses. The biologically active materials are entrapped within liposomes encapsulated within semipermeable microcapsules or permeable polymeric matrix. **Release** of

the desired materials is governed by the permeability of both the liposome and the surrounding matrix (the matrix integrity is directly proportional to the liposome integrity); the permeability of the liposome can be engineered by modifying the composition and the method for making the liposome to produce liposome that are sensitive to specific stimuli such as temperature, pH or light. For example, by including a phospholipase that degrades the liposome within some or all of the liposomes or the surrounding matrix, the liposome can be destabilized and broken down over a period of time. Other systems have been developed, e.g. U.S. Pat. No. 4,933,185 by Wheatley et al., which utilize a core made up of a polymer (such as an ionically cross-linked polysaccharide with calcium alginate or chitin) around which there is an ionically bound skin (such as a polycationic skin of poly-L-lysine) whose integrity is dependent on the core polymer. With an impermeable skin, when the core polymer can be degraded by enzymes (such as alginase from the bacteria, **chitinase** or hydrolase), there is a sudden **release** of biologically active substance from the core. Alternatively, the skin can be partially permeable for a gradual **release of drug** upon degradation of the core.

PGPUB-DOCUMENT-NUMBER: 20020086008

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020086008 A1

TITLE: Human chitinase, its recombinant production, its use for decomposing chitin, its use in therapy or prophylaxis against infection diseases

PUBLICATION-DATE: July 4, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Aerts, Johannes Maria Franciscus Gerardus	Abcoude		NL	

APPL-NO: 09/ 977827

DATE FILED: October 15, 2001

RELATED-US-APPL-DATA:

child 09977827 A1 20011015

parent continuation-of 09343623 19990630 US GRANTED

parent-patent 6303118 US

US-CL-CURRENT: 424/94.61, 435/200 , 435/320.1 , 435/325 , 435/69.1 , 536/23.2

ABSTRACT:

A human chitinase, its recombinant production, its use for decomposing chitin, its use in therapy or prophylaxis against infection diseases
A new human chitinase having an amino acid sequence as shown in FIG. 1 or FIG. 2. Modified forms of it having a similar chitin-hydrolyzing activity, and antigenic peptides representing one of its epitopes. Recombinant production of the human chitinase by genetically engineered hosts or host cells. Recombinant nucleic acid encoding it, and human chitinase-specific oligonucleotides. Use for therapeutic or prophylactic treatment of humans against infection by chitin-containing pathogens, or for decomposing chitin, e.g. from chitin-based articles. Antibodies binding to the human chitinase. Diagnostic test kits comprising the human chitinase, its antigenic peptides, human chitinase antibodies, recombinant nucleic acid or oligonucleotides.

---------- KWIC ---------

Summary of Invention Paragraph - BSTX (76):

[0073] Furthermore, this invention provides chitin-based articles of manufacture comprising a chitin-hydrolyzing amount of the new human **chitinase**. E.g., the chitin-based article of manufacture may be a **drug**-containing **drug** carrier or **implant** for controlled **drug release**, or a transient functional **implant**.

Detail Description Paragraph - DETX (40):

[0127] For example, drugs could be incorporated in chitin based capsules (`chitosomes`). The concomitant presence of well defined amounts of human **chitinase** in the capsule could ensure a controlled **release** of drugs. A slow but gradual **release of drug** could particularly be envisioned when it is trapped in a chitin matrix. The use of the human enzyme in such a system would result in ultimate destruction of the chitin-based capsule and not elicit an immunological response. The drugs used in such a system could vary from small compounds to proteins and DNA fragments for the purpose of enzyme and gene therapy. Chitin (or analogues) is already employed as a carrier for drugs (20).

PGPUB-DOCUMENT-NUMBER: 20020082220

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020082220 A1

TITLE: Composition and method for the repair and regeneration of cartilage and other tissues

PUBLICATION-DATE: June 27, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Hoemann, Caroline D.	Montreal		CA	
Buschmann, Michael D.	Montreal		CA	
McKee, Marc D.	Westmount		CA	

APPL-NO: 09/ 896912

DATE FILED: June 29, 2001

RELATED-US-APPL-DATA:

non-provisional-of-provisional 60214717 20000629 US

US-CL-CURRENT: 514/21, 514/54 , 514/55 , 514/56

ABSTRACT:

The present invention relates to a new method for repairing human or animal tissues such as cartilage, meniscus, ligament, tendon, bone, skin, cornea, periodontal tissues, abscesses, resected tumors, and ulcers. The method comprises the step of introducing into the tissue a temperature-dependent polymer gel composition such that the composition adhere to the tissue and promote support for cell proliferation for repairing the tissue. Other than a polymer, the composition preferably comprises a blood component such as whole blood, processed blood, venous blood, arterial blood, blood from bone, blood from bone-marrow, bone marrow, umbilical cord blood, placenta blood, erythrocytes, leukocytes, monocytes, platelets, fibrinogen, thrombin and platelet rich plasma. The present invention also relates to a new composition to be used with the method of the present invention.

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims benefit under 35 USC .sctn.119(e) of priority application No. 60/214,717 filed Jun. 29, 2000, the entire content of which is hereby incorporated by reference.

---------- KWIC ---------

Summary of Invention Paragraph - BSTX (25):

[0025] Chitosan, which primarily results from the alkaline deacetylation of chitin, a natural component of shrimp and crab shells, is a family of linear polysaccharides that contains 1-4 linked glucosamine (predominantly) and N-acetyl-glucosamine monomers (Austin et all. 1981). Chitosan and its amino-substituted derivatives are pH-dependent, bioerodible and biocompatible cationic polymers that have been used in the biomedical industry for wound healing and bone induction (Denuziere et al., 1998; Muzzarelli et al., 1993 and 1994), **drug** and gene **delivery** (Carreno-Gomez and Duncan, 1997; Schipper et al., 1997; Lee et al., 1998; Bernkop-Schnurch and Pasta, 1998) and in scaffolds for cell growth and cell encapsulation (Yagi et al, 1997, Eser Elcin et al., 1998; Dillon et al., 1998; Koyano et al., 1998; Sechriest et al, 2000; Lahiji et al 2000; Suh et al., 2000). Chitosan is termed a mucoadhesive polymer (Bernkop-Schnurch and Krajicek, 1998) since it adheres to the mucus layer of the gastrointestinal epithelia via ionic and hydrophobic interactions, thereby facilitating peroral **drug delivery**. Biodegradability of chitosan occurs via its susceptibility to enzymatic cleavage by **chitinases** (Fukamizo and Brzezinski, 1997), lysozymes (Sashiwa et al., 1990), cellulases (Yalpani and Pantaleone, 1994), proteases (Terbojevich et al., 1996), and lipases (Muzzarelli et al., 1995). Recently, chondrocytes have been shown to be capable of expressing chitotriosidase (Vasios et al., 1999), the human analogue of chitosanase; its physiological role may be in the degradation of hyaluronan, a linear polysaccharide possessing some similarity with chitosan since it is composed of disaccharides of N-acetyl-glucosamine and glucuronic acid.

PGPUB-DOCUMENT-NUMBER: 20020049155

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020049155 A1

TITLE: Cobalamin compounds useful as cardiovascular agents and as imaging agents

PUBLICATION-DATE: April 25, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Hogenkamp, Henricus P.C.	Roseville	MN	US	

APPL-NO: 09/ 873142

DATE FILED: May 31, 2001

RELATED-US-APPL-DATA:

non-provisional-of-provisional 60208140 20000531 US

non-provisional-of-provisional 60267782 20010209 US

US-CL-CURRENT: 514/7

ABSTRACT:

The invention provides cobalamin derivatives linked to a cardiovascular agent, as well as pharmaceutical compositions comprising the compounds and methods for using the compounds in treatment or diagnosis of a cardiovascular disease.

[0001] This application claims priority to U.S. provisional application no. 60/208,140, filed on May 31, 2000 and U.S. provisional application no. 60/267,782, filed on Feb. 9, 2001.

---------- KWIC ---------

Detail Description Paragraph - DETX (373):

[0660] Several methods have been developed to reversibly encapsulate biologically active substances. One that can be applied both to in vitro and in vivo studies has been described in U.S. Pat. No. 4,900,556 by Wheatley et al. entitled "System for Delayed and Pulsed **Release** of Biologically-Active Substances." In this disclosed system, the biologically-active substance can be released either at a constant rate over a period of time or in discrete pulses. The biologically active materials are entrapped within liposomes encapsulated within semipermeable microcapsules or permeable polymeric matrix. **Release** of the desired materials is governed by the permeability of both the liposome and

the surrounding matrix (the matrix integrity is directly proportional to the liposome integrity); the permeability of the liposome can be engineered by modifying the composition and the method for making the liposome to produce liposome that are sensitive to specific stimuli such as temperature, pH or light. For example, by including a phospholipase which degrades the liposome within some or all of the liposomes or the surrounding matrix, the liposome can be destabilized and broken down over a period of time. Other systems have been developed, e.g. U.S. Pat. No. 4,933,185 by Wheatley et al., which utilize a core made up of a polymer (such as an ionically cross-linked polysaccharide with calcium alginate or chitin) around which there is an ionically bound skin (such as a polycationic skin of poly-L-lysine) whose integrity is dependent on the core polymer. With an impermeable skin, when the core polymer can be degraded by enzymes (such as alginase from the bacteria, **chitinase** or hydrolase), there is a sudden **release** of biologically active substance from the core. Alternatively, the skin can be partially permeable for a gradual **release of drug** upon degradation of the core.

PGPUB-DOCUMENT-NUMBER: 20020042394

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020042394 A1

TITLE: Cobalamin compounds useful as antibiotic agents and as imaging agents

PUBLICATION-DATE: April 11, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Hogenkamp, Henricus P.C.	Roseville	MN	US	
Collins, Douglas A.	Rochester	MN	US	

APPL-NO: 09/ 873164

DATE FILED: May 31, 2001

RELATED-US-APPL-DATA:

non-provisional-of-provisional 60208148 20000531 US

non-provisional-of-provisional 60267543 20010209 US

US-CL-CURRENT: 514/53, 514/185 , 536/26.44 , 540/145

ABSTRACT:

The invention provides cobalamin derivatives linked to an antibiotic and/or an imaging agent, as well as pharmaceutical compositions comprising the compounds and methods for using the compounds in treatment or diagnosis of a microbial infection.

[0001] This application claims priority to U.S. provisional application No. 60/208,148, filed on May 31, 2000 and U.S. provisional application No. 60/267,543, filed on Feb. 9, 2001.

---------- KWIC ---------

Detail Description Paragraph - DETX (290):

[0678] Several methods have been developed to reversibly encapsulate biologically active substances, One that can be applied both to in vitro and in vivo studies has been described in U.S. Pat. No. 4,900,556 by Wheatley et al. entitled "System for Delayed and Pulsed **Release** of Biologically-Active Substances." In this disclosed system, the biologically-active substance can be released either at a constant rate over a period of time or in discrete pulses. The biologically active materials are entrapped within liposomes encapsulated

within semipermeable microcapsules or permeable polymeric matrix. **Release** of the desired materials is governed by the permeability of both the liposome and the surrounding matrix (the matrix integrity is directly proportional to the liposome integrity); the permeability of the liposome can be engineered by modifying the composition and the method for making the liposome to produce liposome that are sensitive to specific stimuli such as temperature, pH or light. For example, by including a phospholipase that degrades the liposome within some or all of the liposomes or the surrounding matrix, the liposome can be destabilized and broken down over a period of time. Other systems have been developed, e.g. U.S. Pat. No. 4,933,185 by Wheatley et al., which utilize a core made up of a polymer (such as an ionically cross-linked polysaccharide with calcium alginate or chitin) around which there is an ionically bound skin (such as a polycationic skin of poly-L-lysine) whose integrity is dependent on the core polymer. With an impermeable skin, when the core polymer can be degraded by enzymes (such as alginase from the bacteria, **chitinase** or hydrolase), there is a sudden **release** of biologically active substance from the core. Alternatively, the skin can be partially permeable for a gradual **release of drug** upon degradation of the core.

US-PAT-NO: 6541448

DOCUMENT-IDENTIFIER: US 6541448 B2

TITLE: Polypeptide compositions toxic to anthonomus insects, and methods of use

DATE-ISSUED: April 1, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Isaac; Barbara	St. Charles	MO	N/A	N/A
Krieger; Elysia K.	Kirkwood	MO	N/A	N/A
Mettus; Anne-Marie Light	Feasterville	PA	N/A	N/A
Moshiri; Farhad	Chesterfield	MO	N/A	N/A
Sivasupramanian; Sakuntala	Chesterfield	MO	N/A	N/A

APPL-NO: 09/ 853533

DATE FILED: May 11, 2001

PARENT-CASE:

CROSS REFERENCE TO RELATED APPLICATIONS

This application claims benefit under 35 U.S.C. .sctn. 119(e) of U.S. provisional application Ser. No. 60/204,367, filed May 15, 2000.

US-CL-CURRENT: 514/2, 424/246.1 , 530/350

ABSTRACT:

A novel gene encoding a Coleopteran inhibitory Bacillus thuringiensis insecticidal crystal protein is disclosed. The protein, tIC851, is insecticidally active and provides plant protection from at least cotton boll weevil, Anthomomus grandis, when applied to plants in an insecticidally effective composition.

6 Claims, 5 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 5

---------- KWIC ---------

Detailed Description Text - DETX (182):
Goeddel et al., Nucl. Acids Res., 8:4057, 1980. Goelet, Lomonossoff,

Butler, Akam, Gait, Karn, "Nucleotide sequence of tobacco mosaic virus RNA," Proc. Natl. Acad. Sci. USA, 79:5818-5822, 1982. Gonzalez Jr. et al., Proc. Natl. Acad. Sci USA, 79:6951-6955, 1982. Good and Nielsen, Antisense Nucleic Acid **Drug** Dev., 7(4):431-437, 1997. Graham, Craig, Waterhouse, "Expression patterns of vascular-specific promoters ROIC and Sh in transgenic potatoes and their use in engineering PLRV-resistant plants," Plant Mol. Biol., 33(4):729-735, 1997. Graham, F. L., and van der Eb, A. J., "Transformation of rat cells by DNA of human adenovirus 5," Virology, 54(2):536-539, 1973. Green, Nucl. Acids Res., 16(1):369. 1988. Griffith et al., J. Am. Chem. Soc., 117:831-832, 1995. Grochulski et al., J. Mol. Biol., 254:447-464, 1995. Grosset, Alary, Gautier, Menossi, Martinez-Izquierdo, Joudrier, "Characterization of a barley gene coding for an alpha-amylase inhibitor subunit (Cmd protein) and analysis of its promoter in transgenic tobacco plants and in maize kernels by microprojectile bombardment," Plant Mol. Biol., 34(2):331-338, 1997. Guerrier-Takada et al., Cell, 35:849, 1983. Haaima, Lohse, Buchardt, Nielsen, Angew. Chem., Int. Ed. Engl., 35:1939-1942, 1996. Hampel and Tritz, Biochem., 28:4929, 1989. Hampel et al., Nucl. Acids Res., 18:299, 1990. Hanvey et al., Science, 258:1481-1485, 1992. Harlow and Lane, "Antibodies: A Laboratory Manual," Cold Spring Harbor Laboratory, Cold Spring Harbor, N.Y., 1988. Henry-Michelland et al., "Attachment of antibiotics to nanoparticles; Preparation, **drug-release** and antimicrobial activity in vitro, Int. J. Pharm., 35:121-127, 1987. Herrnstadt et al., Bio/Technology, 4:305-308, 1986. Herrnstadt et al., Gene, 57:37-46, 1987. Hess et al., J. Adv. Enzyme Reg., 7:149, 1968. Hess, Intern Rev. Cytol., 107:367, 1987. Hilber, Bodmer, Smith, Koller, "Biolistic transformation of conidia of Botryotinia fuckeliana," Curr. Genet., 25(2):124-127, 1994. Hitzeman et al., J. Biol. Chem., 255:2073, 1980. Hofte and Whiteley, Microbiol. Rev., 53:242-255, 1989. Hofte et al. Nucl. Acids Res., 15:7183, 1987. Holland et al., Biochemistry, 17:4900, 1978. Honee et al., Mol. Microbiol., 5:2799-2806, 1991. Hoover et al., (Eds.), "Remington's Pharmaceutical Sciences," 15th Edition, Mack Publishing Co., Easton, Pa., 1975. Horsch, Fry, Hoffmann, Eichholtz, Rogers, Fraley, "A simple and general method for transferring genes into plants," Science, 227(4691):1229-1231, 1985. Horton et al., Gene, 77:61-68, 1989. Huang, An, McDowell, McKinney, Meagher, "The Arabidopsis ACT11 action gene is strongly expressed in tissues of the emerging inflorescence, pollen and developing ovules," Plant Mol. Biol., 33(1):125-139, 1997. Hudspeth and Grula, "Structure and expression of the maize gene encoding the phosphoenolpyruvate carboxylase isozyme involved in C4 photosynthesis," Plant Mol. Biol., 12:579-589, 1989. Hyrup and Nielsen, Bioorg. Med. Chem., 1996. Ingelbrecht, Herman, Dekeyser, Van Montagu, Depicker, "Different 3' end regions strongly influence the level of gene expression in plant cells," Plant Cell, 1:671-680, 1989. Itakura et al., Science, 198:1056, 1977. Jaeger et al., Proc. Natl. Acad. Sci. USA, 86:7706-7710, 1989. Jameson and Wolf, "The Antigenic Index: A Novel Algorithm for Predicting Antigenic Determinants," Compu. Appl. Biosci., 4(1):181-6, 1988. Jensen et al., Biochemistry, 36(16):5072-5077, 1997. Jobling and Gehrke, "Enhanced translation of chimaeric messenger RNAs containing a plant viral untranslated leader sequence," Nature, 325:622-625, 1987. Johnston and Tang, "Gene gun transfection of animal cells and genetic immunization," Methods Cell. Biol., 43(A):353-365, 1994. Jones, Dean, Gidoni, Gilbert, Bond-Nutter, Lee, Bedbrook, Dunsmuir, "Expression of bacterial **chitinase** protein in tobacco leaves using two photosynthetic gene promoters," Mol. Gen. Genet., 212:536-542, 1988. Jones, Genetics, 85:12 1977. Jorgensen et al., Mol. Gen. Genet., 207:471, 1987. Joshi, "An inspection of

the domain between putative TATA box and translation start site in 79 plant genes," Nucl. Acids Res., 15:6643-6653, 1987. Kaiser and Kezdy, Science, 223:249-255, 1984. Kashani-Saber et al., Antisense Res. Dev., 2:3-15, 1992. Keller et al., EMBO J., 8:1309-14, 1989. Kingsman et al., Gene, 7:141, 1979. Klee, Yanofsky, Nester, "Vectors for transformation of higher plants," Bio-Technology, 3(7):637-642, 1985. Klein et al., Nature, 327:70, 1987. Klein et al., Proc. Natl. Acad. Sci. USA, 85:8502-8505, 1988. Knight et al., J. Biol. Chem., 270:17765-17770, 1995. Koch et al., Tetrahedron Lett., 36:6933-6936, 1995. Kohler and Milstein, Eur. J. Immunol., 6:511-519, 1976. Kohler and Milstein, Nature, 256:495-497, 1975. Koppelhus, Nucleic Acids Res., 25(11):2167-2173, 1997. Korn and Queen, DNA, 3:421-436, 1984. Kozak, Nature, 308:241-246, 1984. Koziel, Beland, Bowman, Carozzi, Crenshaw, Crossland, Dawson, Desai, Hill, Kadwell, Launis, Lewis, Maddox, McPherson, Meghji, Merlin, Rhodes, Warren, Wright, Evola, "Field performance of elite transgenic maize plants expressing an insecticidal protein derived from Bacillus thuringiensis, Bio/technology, 11: 194-200, 1993. Koziel, Carozzi, Desai, "Optimizing expression of transgenes with an emphasis on post-transcriptional events," Plant Mol. Biol., 32(102):393-405, 1996. Koziel, Fujimoto, Izawa, Shimamoto, "Anaerobic induction and tissue Kremsky et al., Tetrahedron Lett., 37:4313-4316, 1996. Krieg et al., AnzSchaed. Iingskde, Pflanzenschutz, Umwelrschulz, 57:145-150, 1984. Krieg et al., In: Zangew. Ent., 96:500-508, 1983. Krieg et al., J. Appl. Ent., 104:417-424, 1987. Kuby, "Immunology" 2nd Edition. W. H. Freeman & Company, New York, 1994. Kunkel, Roberts, Zakour, "Rapid and efficient site-specific mutagenesis without phenotypic selection," Methods Enzymol., 154:367-382, 1987. Kwoh, Davis, Whitfield, Chappelle, DiMichele, Gingeras, "Transcription-based amplification system and detection of amplified human immunodeficiency virus type 1 with a bead-based sandwich hybridization format," Proc. Natl. Acad. Sci. USA, 86(4):1173-1177, 1989. Kyozuka, Fujimoto, Izawa, Shimamoto, "Anaerobic induction and tissue-specific expression of maize Adh1 promoter in transgenic rice plants and their progeny," Mol. Gen. Genet., 228(1-2):40-48, 1991. Kyte and Doolittle, "A simple method for displaying the hydropathic character of a protein," J. Mol. Biol., 157(1):105-132, 1982. L'Huillier et al., EMBO J., 11:4411-8, 1992. Ladd Jr., J. Econ. Entomol., 79:00668-671, 1986. Lambert et al., Appl. Environ. Microbiol., 58:2536-2642, 1992b. Lambert et al., Gene, 110: 131-132, 1992a. Landsdorp et al., Hum. Mol. Genet., 5:685-691, 1996. Langridge et al., Proc. Natl. Acad. Sci. USA, 86:3219-3223, 1989. Lee et al., Biochem. Biophys. Res. Comm., 216:306-312, 1995. Lieber et al., Methods Enzymol., 217:47-66, 1993. Lindstrom et al., Developmental Genetics, 11: 160, 1990. Lisziewicz et al., Proc. Natl. Acad. Sci. U.S.A., 90:8000-4, 1993. Lorz et al., Mol. Gen. Genet., 199:178, 1985. Lu, Xiao, Clapp, Li, Broxmeyer, "High efficiency retroviral mediated gene transduction into single isolated immature and replatable CD34(3+) hematopoietic stem/progenitor cells from human umbilical cord blood," J. Exp. Med., 178(6):2089-2096, 1993. Luehrsen and Walbot, "Intron enhancement of gene expression and the splicing efficiency of introns in maize cells," Mol. Gen. Genet., 225:81-93, 1991. Luo et al., Plant Mol. Biol. Reporter, 6:165, 1988. Lutcke, Chow, Mickel, Moss, Kern, Scheele, "Selection of AUG initiation codons differs in plants and animals," EMBO J., 6:43-48, 1987. Maas, Laufs, Grant, Korfhage, Werr, "The combination of a novel stimulatory element in the first exon of the maize shrunken-1 gene with the following intron enhances reporter gene expression 1000-fold," Plant Mol. Biol., 16:199-207, 1991. Macaluso and Mettus, J. Bacteriol., 173:1353-1356, 1991. Maddock et al., Third International Congress of Plant Molecular Biology,

Abstract 372, 1991. Maloy, "Experimental Techniques in Bacterial Genetics" Jones and Bartlett Publishers, Boston, Mass., 1990. Maloy et al., "Microbial Genetics" 2nd Edition. Jones and Barlett Publishers, Boston, Mass., 1994. Maniatis et al., "Molecular Cloning: a Laboratory Manual," Cold Spring Harbor Laboratory, Cold Spring Harbor, N.Y., 1982. Marcotte et al., Nature, 335:454, 1988. Mascerenhas, Mettler, Pierce, Lowe, "Intron mediated enhancement of heterologous gene expression in maize," Plant Mol. Biol., 15:913-920, 1990. Masson et al., J. Biol. Chem., 270:20309-20315, 1995. McBride, Svab, Schaaf, Hogan, Stalker, Maliga, "Amplification of a chimeric Bacillus gene in chloroplasts leads to an extraordinary level of an insecticidal protein in tobacco," Bio/technology, 13:362-365, 1995. McCabe et al., Biotechnology, 6:923, 1988. McDevitt et al., Cell, 37:993-999, 1984. McElroy, Zhang, Wu, "Isolation of an efficient promoter for use in rice transformation," Plant Cell, 2:163-171, 1990. McPherson et al., Bio/Technology, 6:61-66, 1988. Mettus and Macaluso, Appl. Environ. Microbiol., 56:1128-1134, 1990. Michael, Biotechniques, 16:410-412, 1994. Mollegaard, Buchardt, Egholm, Nielsen, Proc. Natl. Acad. Sci. USA, 91:3892-3895, 1994. Nawrath, Poirier, Somerville, "Targeting of the polyhydroxybutyrate biosynthetic pathway to the plastids of Arabidopsis thaliana results in high levels of polymer accumulation," Proc. Natl. Acad. Sci. USA, 91:12760-12764, 1994. Neilsen, In: Perspectives in **Drug** Discovery and Design 4, Escom Science Publishers, pp. 76-84, 1996. Neuhaus et al., Theor. Appl. Genet., 75:30, 1987. Nielsen et al., Anticancer **Drug** Des., 8(1):53-63, 1993b. Nielsen, Egholm, Berg, Buchardt, Science, 254:1497-1500, 1991. Norton et al., Plasmid, 13:211-214, 1985. Norton, Piatyszek, Wright, Shay, Corey, Nat. Biotechnol., 14:615-620, 1996. Norton, Waggenspack, Varnum, Corey, Bioorg. Med. Chem., 3:437-445, 1995. Oard, Paige, Dvorak, "Chimeric gene expression using maize intron in cultured cells of breadwheat," Plant Cell. Rep., 8:156-160, 1989. Odell et al., Nature, 313:810, 1985. Ohkawa, Yuyama, Taira, "Activities of HIV-RNA targeted ribozymes transcribed from a `shot-gun` type ribozyme-trimming plasmid," Nucl. Acids Symp. Ser., 27:15-6, 1992. Ojwang et al., Proc. Natl. Acad. Sci. USA, 89:10802-6, 1992. Omirulleh et al., Plant Mol. Biol., 21:415-428, 1993. Orum, Nielsen, Egholm, Berg, Buchardt, Stanley, Nucl. Acids Res., 21:5332-5336, 1993. Orum, Nielsen, Jorgensen, Larsson, Stanley, Koch, BioTechniques, 19:472-480, 1995. Pandey and Marzluff, In "RNA Processing," p. 133, Cold Spring Harbor Laboratory, Cold Spring Harbor, N.Y., 1987. Pardridge, Boado, Kang, Proc. Natl. Acad. Sci. USA, 92:5592-5596, 1995. Pena et al., Nature, 325:274, 1987. Perlak, Deaton, Armstrong, Fuchs, Sims, Greenplate, Fischhoff, "Insect resistant cotton plants," Bio/Technology, 8:939-943, 1990. Perlak, Fuchs, Dean, McPherson, Fischhoff, "Modification of the coding sequence enhances plant expression of insect control protein genes," Proc. Natl. Acad. Sci. USA, 88:3324-3328, 1991. Perlak, Stone, Muskopf, Peterson, Parker, McPherson, Wyman, Love, Reed, Biever, Fischhoff, "Genetically improved potatoes: protection from damage by Colorado potato beetles," Plant Mol. Biol., 22:313-321, 1993. Perrault et al, Nature, 344:565, 1990. Perrotta and Been, Biochem., 31:16, 1992. Perry-O'Keefe, Yao, Coull, Fuchs, Egholm, Proc. Natl. Acad. Sci. USA, 93:14670-14675, 1996. Petersen, Jensen, Egholm, Nielsen, Buchardt, Bioorg. Med. Chem. Lett., 5:1119-1124, 1995. Pieken et al., Science, 253:314, 1991. Poogin and Skryabin, "The 5' untranslated leader sequence of potato virus X RNA enhances the expression of the heterologous gene in vivo," Mol. Gen. Genet., 234:329-331, 1992. Poszkowski et al., EMBO J., 3:2719, 1989. Potrykus et al., Mol. Gen. Genet., 199:183, 1985. Poulsen et al., Mol. Gen. Genet., 205:193-200, 1986. Prokop and Bajpai, Ann. N. Y.

Acad. Sci., 646, 1991. Rogers et al., In: Methods For Plant Molecular Biology, Weissbach and Weissbach, eds., Academic Press Inc., San Diego, Calif. 1988. Rogers et al., Methods Enzymol., 153:253-277, 1987. Rose, Anal. Chem., 65(24):3545-3549, 1993. Rossi et al., Aids Res. Hum. Retrovir., 8:183, 1992. Rupar et al., Appl. Environ.

US-PAT-NO: 6468523

DOCUMENT-IDENTIFIER: US 6468523 B1

TITLE: Polypeptide compositions toxic to diabrotic insects, and methods of use

DATE-ISSUED: October 22, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Mettus; Anne-Marie Light	Feasterville	PA	N/A	N/A
Baum; James A.	Doylestown	PA	N/A	N/A

APPL-NO: 09/ 184748

DATE FILED: November 2, 1998

US-CL-CURRENT: 424/93.2, 424/93.461 , 514/12 , 514/2 , 530/350 , 530/825

ABSTRACT:

Disclosed is a novel Lepidopteran- and Coleopteran-active .delta.-endotoxin polypeptide, and compositions comprising the polypeptide, peptide fragments thereof, and antibodies specific therefor. Also disclosed are vectors, transformed host cells, and transgenic plants that comprise nucleic acid segments encoding the polypeptide. Also disclosed are methods of identifying related polypeptides and polynucleotides, methods of making and using transgenic cells comprising the novel sequences of the invention, as well as methods for controlling an insect population, such as the Western Corn Rootworm and Colorado potato beetle, and for conferring to a plant population resistance to the target insect species.

20 Claims, 1 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 1

---------- KWIC ---------

Detailed Description Text - DETX (331):

Corey, "Peptide nucleic acids: expanding the scope of nucleic acid recognition," Trends Biotechnol., 15(6):224-229, 1997. Couvreur et al., "Nanocapsules, a new lysosomotropic carrier," FEBS Lett., 84:323-326, 1977. Couvreur, "Polyalkyleyanoacrylates as colloidal **drug** carriers," Crit. Rev. Ther. **Drug** Carrier Syst., 5:1-20, 1988. Crickmore et al., Abstr. 28th Annu. Meet. Soc. Invert. Pathol., Cornell University, Ithaca, N.Y., 1995. Cristou

et al., Plant Physiol., 87:671-674, 1988. Curiel, Agarwal, Wagner, Cotten, "Adenovirus enhancement of transferrin-polylysine-mediated gene **delivery**," Proc. Natl. Acad. Sci. USA, 88(19):8850-8854, 1991. Curiel, Wagner, Cotten, Birnstiel, Agarwal, Li, Loechel, and Hu, "High-efficiency gene transfer mediated by adenovirus coupled to DNA-polylysine complexes," Hum. Gen. Ther., 3(2):147-154, 1992. Daum, "Revision of two computer programs for probit analysis," Bull. Entomol. Soc. Amer., 16:10-15, 1970. de Barjac, In: Microbial Control of Pests and Plant Diseases, H. D. Burges (Ed.), Academic Press, London, pp 36-43, 1981. Dean, Tamaki, Dunsmuir, Favreau, Katayama, Dooner, Bedbrook, "mRNA transcripts of several plant genes are polyadenylated multiple sites in vivo," Nucl. Acids Res., 14(5):2229-2240, 1986. Dennis, Gerlach, Pryor, Bennetzen, Inglis, Llewellyn, Sachs, Ferl, Peackocock, "Molecular analysis of the alcohol dehydrogenase (Adh1) gene of maize," Nucl. Acids Res., 12:3983-4000, 1984. Dhir, Dhir, Hepburn, Widholm, "Factors affecting transient gene expression in electroporated Glycine-max protoplasts," Plant Cell Rep., 10(2):106-110, 1991a. Dhir, Dhir, Sturtevant, Widholm, "Regeneration of transformed shoots for electroporated soybean Glycine max L. Merr. Protoplasts, Plant Cell Rep., 10(2):97-101, 1991b. Donovan, Rupar, Slaney, Malvar, Gawron-Burke, Johnson, "Characterization of two genes encoding Bacillus thuringiensis insecticidal crystal proteins toxic to Coleoptera species," Appl. Environ. Microbiol., 58(12):3921-3927, 1992. Donovan, Gonzalez Jr., Gilbert, Dankocsik, "Isolation and characterization of EG2158, a new strain of Bacillus thuringiensis toxic to coleopteran larvae, and nucleotide sequence of the toxin gene," Mol. Gen. Genet., 214(3):365-372, 1988. Dropulic, Lin, Martin, Jeang, "Functional characterization of a U5 ribozyme: intracellular suppression of human immunodeficiency virus type 1 expression," J. Virol., 66(3):1432-1441, 1992. Dueholm et al., J. Org. Chem., 59:5767-5773, 1994. Egholm, Buchardt, Christensen, Behrens, Freier, Driver, Berg, Kim, Norden, Nielsen, "PNA hybridizes to complementary oligonucleotides obeying the Watson-Crick hydrogen-bonding rules," Nature, 365(6446):566-568, 1993. Eglitis and Anderson, "Retroviral vectors for introduction of genes into mammalian cells," Biotechniques, 6(7):608-614, 1988. Eglitis, Kantoff, Kohn, Karson, Moen, Lothrop, Blaese, Anderson, "Retroviral-mediated gene transfer into hemopoietic cells," Avd. Exp. Med. Biol., 241:19-27, 1988. Eichenlaub, "Mutants of the mini-F plasmid pML31 thermosensitive in replication," J. Bacteriol., 138(2):559-566, 1979. Elroy-Stein and Moss, "Cytoplasmic expression system based on constitutive synthesis of bacteriophage T7 RNA polymerase in mammalian cells," Proc. Natl. Acad. Sci. USA, 87(17):6743-6747, 1990. English and Slatin, Insect Biochem. Mol. Biol., 22:1-7, 1992. Faktor, Kooter, Dixon, Lamb, "Functional dissection of a bean chalcone synthase gene promoter in transgenic tobacco plants reveals sequence motifs essential for floral expression," Plant Mol. Biol., 32(5):849-859, 1996. Ficker, Kirch, Eijlander, Jacobsen, Thompson, "Multiple elements of the S2-RNase promoter from potato (Solanum tuberosum L.) are required for cell type-specific expression in transgenic potato and tobacco," Mol. Gen. Genet., 257(2):132-142, 1998. Fiers, Contreras, haegemann, Rogiers, Van de Voorde, Van Heuverswyn, Van Herreweghe, Volckaert, Ysebaert, "Complete nucleotide sequence of SV40 DNA, Nature, 273(5658):113-120, 1978. Footer, Egholm, Kron, Coull, Matsudaira, "Biochemical evidence that a D-loop is part of a four-stranded PNA-DNA bundle. Nickel-mediated cleavage of duplex DNA by a Gly-Gly-His bis-PNA," Biochemistry, 35(33):10673-10679, 1996. Fraley et al., Biotechnology, 3:629, 1985. Fraley, Rogers, Horsch, Sanders, Flick, Adams, Bittner, Brand, Fink, Fry, Galluppi, Goldberg, Hoffmann, Woo, "Expression of

bacterial genes in plant cells," Proc. Natl. Acad. Sci. USA, 80(15):4803-4807, 1983. French, Janda, Ahlquist, "Bacterial gene inserted in an engineered RNA virus: efficient expression in monocotyledonous plant cells," Science, 231:1294-1297, 1986. Frohman, In: PCR.TM. Protocols: A Guide to Methods and Applications, Academic Press, New York, 1990. Fromm, Taylor, Walbot, "Expression of genes transferred into monocot and dicot plant cells by electroporation," Proc. Natl. Acad Sci. USA, 82(17):5824-5828, 1985. Fromm, Taylor, Walbot, "Stable transformation of maize after gene transfer by electroporation," Nature, 319(6056):791-793, 1986. Fujimura et al., Plant Tiss. Cult. Lett., 2:74, 1985. Fynan, Webster, Fuller, Haynes, Santoro, Robinson, "DNA vaccines: protective immunizations by parenteral, mucosal, and gene gun inoculations," Proc. Natl. Acad. Sci. USA, 90(24):11478-11482, 1993. Gallie and Young, "The regulation of expression in transformed maize aleurone and endosperm protoplasts," Plant Physiol., 106:929-939, 1994. Gallie, Feder, Schimke, Walbot, "Post-transcriptional regulation in higher eukaryotes: the role of the reporter gene in controlling expression," Mol. Gen. Genet., 228:258-264, 1991. Gallie, Lucas, Walbot, "Visualizing mRNA expression in plant protoplasts: factors influencing efficient mRNA uptake and translation," Plant Cell, 1:301-311, 1989. Gallie, Sleat, Turner, Wilson, "Mutational analysis of the tobacco mosaic virus 5'-leader for altered ability to enhance translation," Nucl. Acids Res., 16:883-893, 1988. Gallie, Sleat, Watts, Turner, Wilson, "A comparison of eukaryotic viral 5'-leader sequences as enhancers of mRNA expression in vivo," Nucl. Acids Res., 15:8693-8711, 1987b. Gallie, Sleat, Watts, Turner, Wilson, "The 5'-leader sequence of tobacco mosaic virus RNA enhances the expression of foreign gene transcripts in vitro and in vivo," Nucl. Acids Res., 15:3257-3273, 1987a. Gambacorti-Passerini, Mologni, Bertazzoli, le Coutre, Marchesi, Grignani, Nielsen, "In vitro transcription and translation inhibition by anti-promyelocytic leukemia (PML)/retinoic acid receptor alpha and anti-PML peptide nucleic acid," Blood, 88(4):1411-1417, 1996. Gao and Huang, "Cytoplasmic expression of a reporter gene by co-delivery of T7 RNA polymerase and T7 promoter sequence with cationic liposomes," Nucl. Acids Res., 21(12):2867-2872, 1993. Gawron-Burke and Baum, "Genetic manipulation of Bacillus thuringiensis insecticidal crystal protein genes in bacteria," Genet. Eng. (NY), 13:237-263, 1991. Gefter, Margulies, Scharff, "A simple method for polyethylene glycol-promoted hybridization of mouse myeloma cells," Somat. Cell Genet., 3(2):231-236, 1977. Gehrke, Auron, Quigley, Rich, Sonenberg, "5'-Conformation of capped alfalfa mosaic virus ribonucleic acid 4 may reflect its independence of the cap structure or of cap-binding protein for efficient translation," Biochemistry, 22:5157-5164, 1983. Genovese and Milcarek, In: RNA Processing, Cold Spring Harbor Laboratory, Cold Spring Harbor, N.Y., p 62, 1988. Gil and Proudfoot, "A sequence downstream of AAUAAA is required for rabbit beta-globin mRNA 3'-end formation," Nature, 312(5993):473-474, 1984. Gill, Cowles, Francis, "Identification, isolation, and cloning of a Bacillus thuringiensis CrylAc toxin-binding protein from the midgut of the lepidopteran insect Heliothis virescens," J. Biol. Chem., 270(45):27277-27282, 1995. Goding, In: Monoclonal Antibodies: Principles and Practice, 2nd Edition, Academic Press, Orlando, Fla., pp 60-74, 1986. Goeddel, Heyneker, Hozumi, Arentzen, Itakura, Yansura, Ross, Miozzari, Crea, Seeburg, "Direct expression in Escherichia coli of a DNA sequence for human growth hormone," Nature, 281(5732):544-548, 1979. Goeddel, Shepard, Yelverton, Leung, Crea, Sloma, Pestka, "Synthesis of human fibroblast interferon by E. coli, " Nucl. Acids Res., 8(18):4057-4074, 1980. Goelet, Lomonossoff, Butler, Akam, Gait, Kam, "Nucleotide sequence of tobacco mosaic

virus RNA," Proc. Natl. Acad. Sci. USA, 79:5818-5822, 1982. Gonzalez Jr. et al., Proc. Natl. Acad. Sci USA, 79:6951-6955, 1982. Good and Nielsen, Antisense Nucl. Acid **Drug** Dev., 7(4):431-437, 1997. Graham, Craig, Waterhouse, "Expression patterns of vascular-specific promoters RO1C and Sh in transgenic potatoes and their use in engineering PLRV-resistant plants," Plant Mol. Biol., 33(4):729-735, 1997. Graham and van der Eb, "Transformation of rat cells by DNA of human adenovirus 5," Virology, 54(2):536-539, 1973. Green, Issemann, Sheer, "A versatile in vivo and in vitro eukaryotic expression vector for protein engineering," Nucl. Acids Res., 16(1):369, 1988. Griffith et al.,J. Am. Chem. Soc., 117:831-832, 1995. Grochulski, Masson, Borisova, Pusztai-Carey, Schwartz, Brousseau, Cygler, "Bacillus thuringiensis CrylA(a) insecticidal toxin: crystal structure and channel formation," J. Mol. Biol., 254(3):447-464, 1995. Grosset, Alary, Gautier, Menossi, Martinez-Izquierdo, Joudrier, "Characterization of a barley gene coding for an alpha-amylase inhibitor subunit (Cmd protein) and analysis of its promoter in transgenic tobacco plants and in maize kernels by microprojectile bombardment," Plant Mol. Biol., 34(2):331-338, 1997. Guerrier-Takada, Gardiner, Marsh, Pace, Altman, "The RNA moiety of ribonuclease P is the catalytic subunit of the enzyme," Cell, 35(3 Pt 2):849-857, 1983. Haaima, Lohse, Buchardt, Nielsen, Angew. Chem., Int. Ed. Engl., 35:1939-1942, 1996. Hampel and Tritz, "RNA catalytic properties of the minimum (-)sTRSV sequence," Biochemistry, 29(12):4929-4933, 1989. Hampel, Tritz, Hicks, Cruz, "Hairpin' catalytic RNA model: evidence for helices and sequence requirement for substrate RNA," Nucl. Acids Res., 18(2):299-304, 1990. Hanvey, Peffer, Bisi, Thomson, Cadilla, Josey, Ricca, Hassman, Bonham, Au KG et al., Science, 258(5087):1481-1485, 1992. Harlow and Lane, In: Antibodies: A Laboratory Manual, Cold Spring Harbor Laboratory, Cold Spring Harbor, N.Y., 1988. Henry-Michelland et al., "Attachment of antibiotics to nanoparticles; Preparation, **drug-release** and antimicrobial activity in vitro," Int. J. Pharm., 35:121-127, 1987. Herrnstadt et al., Bio/Technology, 4:305-308, 1986. Herrnstadt, Gilroy, Sobieski, Bennett, Gaertner, "Nucleotide sequence and deduced amino acid sequence of a coleopteran-active delta-endotoxin gene from Bacillus thuringiensis subsp. san diego," Gene, 57(1):37-46, 1987. Hess, Boiteux, Kruger, "Cooperation of glycolytic enzymes," Adv. Enzyme Regul., 7:149-167, 1969. Hess, Intern Rev. Cytol., 107:367, 1987. Hilber, Bodmer, Smith, Koller, "Biolistic transformation of conidia of Botryotinia fuckeliana," Curr. Genet., 25(2):124-127, 1994. Hitzeman, Clarke, Carbon, "Isolation and characterization of the yeast 3-phosphoglycerokinase gene (PGK) by an immunological screening technique," J. Biol. Chem., 255(24):12073-12080, 1980. Hofte and Whiteley, "Insecticidal crystal proteins of Bacillus thuringiensis, " Microbiol. Rev., 53(2):242-255, 1989. Hofte, Seurinck, Van houstven, Vaeck, "Nucleotide sequence of a gene encoding an insecticidal protein of Bacillus thuringiensis var. tenebrionis toxic against Coleoptera," Nucl. Acids Res., 15(17):7183, 1987. Holland and Holland, "Isolation and identification of yeast messenger ribonucleic acids coding for enolase, glyceraldehyde-3-phosphate dehydrogenase, and phosphoglycerate kinase," Biochemistry, 17(21):4900-4907, 1978. Honee, Convents, Van Rie, Jansens, Peferoen, Visser, "The C-terminal domain of the toxic fragment of a Bacillus thuringiensis crystal protein determines receptor binding," Mol. Microbiol., 5(11):2799-2806, 1991. Hoover et al., (Eds.), In: Remington's Pharmaceutical Sciences, 15th Edition, Mack Publishing Co., Easton, Pa., 1975. Hopp and Woods, "Prediction of protein antigenic determinants from amino acid sequences," Proc. Natl. Acad. Sci. USA, 78(6):3824-3828, 1981. Horsch, Fry, Hoffmann, Eichholtz, Rogers, Fraley, "A simple and general method for

transferring genes into plants," Science, 227(4691):1229-1231, 1985. Horton, Hunt, Ho, Pullen, Pease, "Engineering hybrid genes without the use of restriction enzymes: genen splicing by overlap extension," Gene, 77(1):61-68, 1989. Huang, An, McDowell, McKinney, Meagher, "The Arabidopsis ACT11 action gene is strongly expressed in tissues of the emerging inflorescence, pollen and developing ovules," Plant Mol. Biol., 33(1):125-139, 1997. Hudspeth and Grula, "Structure and expression of the maize gene encoding the phosphoenolpyruvate carboxylase isozyme involved in C4 photosynthesis," Plant Mol. Biol., 12:579-589, 1989. Hyrup and Nielsen, "Peptide nucleic acids (PNA): synthesis, properties and potential applications," Bioorg. Med. Chem., 4(1):5-23, 1996. Ingelbrecht, Herman, Dekeyser, Van Montagu, Depicker, "Different 3' end regions strongly influence the level of gene expression in plant cells," Plant Cell, 1:671-680, 1989. Itakura, Hirose, Crea, Riggs, Heyneker, Bolivar, Boyer, "Expression in Escherichia coli of a chemically synthesized gene for the hormone somatostatin," Science, 198(4321)1056-1063, 1977. Jaeger, Turner, Zuker, "Improved predictions of secondary structures for RNA," Proc. Natl. Acad Sci. USA, 86(20):7706-7710, 1989. Jameson and Wolf, "The Antigenic Index: A Novel Algorithm for Predicting Antigenic Determinants," Compu. Appl. Biosci., 4(1):181-6, 1988. Jensen, Orum, Nielsen, Norden, "Kinetics for hybridization of peptide nucleic acids (PNA) with DNA and RNA studied with the BIAcore technique," Biochemistry, 36(16):5072-5077, 1997. Jobling and Gehrke, "Enhanced translation of chimaeric messenger RNAs containing a plant viral untranslated leader sequence," Nature, 325:622-625, 1987. Johnston and Tang, "Gene gun transfection of animal cells and genetic immunization," Methods Cell. Biol., 43(A):353-365, 1994. Jones, Dean, Gidoni, Gilber, Bond-Nutter, Lee, Bedbrook, Dunsmuir, "Expression of bacterial **chitinase** protein in tobacco leaves using two photosynthetic gene promoters," Mol. Gen. Genet., 212:536-542, 1988. Jones, "Proteinase mutants of Saccharomyces cerevisiae," Genetics, 85(1):23-33, 1977. Joshi, "An inspection of the domain between putative TATA box and translation start site in 79 plant genes," Nucl. Acids Res., 15:6643-6653, 1987. Kaiser and Kezdy, "Amphiphilic secondary structure: design of peptide hormones," Science, 223(4633):249-255, 1984. Kashani-Saber et al., Antisense Res. Dev., 2:3-15, 1992. Keller et al., EMBO J., 8:1309-14, 1989.

US-PAT-NO: 6416977

DOCUMENT-IDENTIFIER: US 6416977 B1

TITLE: Flea chitinase nucleic acid molecules and uses thereof

DATE-ISSUED: July 9, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Becher; Anna M.	Fort Collins	CO	N/A	N/A

APPL-NO: 09/ 545814

DATE FILED: April 7, 2000

PARENT-CASE:

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims priority to U.S. Provisional Application Serial No. 60/128,833, filed Apr. 9, 1999 entitled "FLEA CHITINASE NUCLEIC ACID MOLECULES, PROTEINS AND USES THEREOF".

US-CL-CURRENT: 435/69.1, 435/252.3 , 435/320.1 , 530/350 , 536/23.6

ABSTRACT:

The present invention relates to flea chitinase nucleic acid molecules, proteins encoded by such nucleic acid molecules, antibodies raised against such proteins, and inhibitors of such proteins. The present invention also includes therapeutic compositions comprising such nucleic acid molecules, proteins, antibodies, and/or other inhibitors, as well as their use to protect an animal from flea infestation.

12 Claims, 0 Drawing figures

Exemplary Claim Number: 1

---------- KWIC ---------

Brief Summary Text - BSTX (70):

A preferred nucleic acid molecule of the present invention, when administered to an animal, is capable of protecting that animal from flea infestation. As will be disclosed in more detail below, such a nucleic acid molecule can be, or encode, an antisense RNA, a molecule capable of triple helix formation, a ribozyme, or other nucleic acid-based **drug** compound. In additional embodiments, a nucleic acid molecule of the present invention can

encode a protective protein (e.g., an **chitinase** protein of the present invention), the nucleic acid molecule being **delivered** to the animal, for example, by direct injection (i.e., as a nucleic acid vaccine) or in a vehicle such as a recombinant virus vaccine or a recombinant cell vaccine.

US-PAT-NO: 6303118

DOCUMENT-IDENTIFIER: US 6303118 B1
See image for Certificate of Correction

TITLE: Human chitinase, its recombinant production, its use for decomposing chitin, its use in therapy or prophylaxis against infection diseases

DATE-ISSUED: October 16, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Aerts; Johannes Maria Franciscus Gerardus	Abcoude	N/A	N/A	NL

APPL-NO: 09/ 343623

DATE FILED: June 30, 1999

PARENT-CASE:

This application is a divisional application of U.S. Ser. No. 08/486,839 filed on Jun. 7, 1995, issued as U.S. Pat. No. 5,928,928.

US-CL-CURRENT: 424/94.61, 435/209 , 536/23.2

ABSTRACT:

A new human chitinase having an amino acid sequence as shown in FIG. 1 or FIG. 2. Modified forms of it having a similar chitin-hydrolyzing activity, and antigenic peptides representing one of its epitopes. Recombinant production of the human chitinase by genetically engineered hosts or host cells. Recombinant nucleic acid encoding it, and human chitinase-specific oligonucleotides. Use for therapeutic or prophylactic treatment of humans against infection by chitin-containing pathogens, or for decomposing chitin, e.g. from chitin-based articles. Antibodies binding to the human chitinase. Diagnostic test kits comprising the human chitinase, its antigenic peptides, human chitinase antibodies, recombinant nucleic acid or oligonucleotides.

6 Claims, 5 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 5

---------- KWIC ---------

Brief Summary Text - BSTX (78):

Furthermore, this invention provides chitin-based articles of manufacture comprising a chitin-hydrolyzing amount of the new human **chitinase**. E.g., the chitin-based article of manufacture may be a **drug**-containing **drug** carrier or **implant** for controlled **drug release**, or a transient functional **implant**.

Detailed Description Text - DETX (39):

For example, drugs could be incorporated in chitin based capsules (`chitosomes`). The concomitant presence of well defined amounts of human **chitinase** in the capsule could ensure a controlled **release** of drugs. A slow but gradual **release of drug** could particularly be envisioned when it is trapped in a chitin matrix. The use of the human enzyme in such a system would result in ultimate destruction of the chitin-based capsule and not elicit an immunological response. The drugs used in such a system could vary from small compounds to proteins and DNA fragments for the purpose of enzyme and gene therapy. Chitin (or analogues) is already employed as a carrier for drugs (20).

US-PAT-NO: 6057142

DOCUMENT-IDENTIFIER: US 6057142 A
See image for Certificate of Correction

TITLE: Human chitinase, its recombinant production, its use for decomposing chitin, its use in therapy or prophylaxis against infection diseases

DATE-ISSUED: May 2, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Aerts; Johannes Maria Franciscus Gerardus	Abcoude	N/A	N/A	NL

APPL-NO: 09/ 151011

DATE FILED: September 10, 1998

PARENT-CASE:

This is a division application of application Ser. No. 08/486,839 filed Jun. 17, 1995 now U.S. Pat. No. 5,928,928.

US-CL-CURRENT: 435/209, 435/252.3 , 435/320.1 , 435/325 , 536/23.2

ABSTRACT:

A new human chitinase having an amino acid sequence as shown in FIG. 1 or FIG. 2. Modified forms of it having a similar chitin-hydrolyzing activity, and antigenic peptides representing one of its epitopes. Recombinant production of the human chitinase by genetically engineered hosts or host cells. Recombinant nucleic acid encoding it, and human chitinase-specific oligonucleotides. Use for therapeutic or prophylactic treatment of humans against infection by chitin-containing pathogens, or for decomposing chitin, e.g. from chitin-based articles. Antibodies binding to the human chitinase. Diagnostic test kits comprising the human chitinase, its antigenic peptides, human chitinase antibodies, recombinant nucleic acid or oligonucleotides.

6 Claims, 5 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 5

---------- KWIC ---------

Brief Summary Text - BSTX (78):

Furthermore, this invention provides chitin-based articles of manufacture comprising a chitin-hydrolyzing amount of the new human **chitinase**. E.g., the chitin-based article of manufacture may be a **drug**-containing **drug** carrier or **implant** for controlled **drug release**, or a transient functional **implant**.

Detailed Description Text - DETX (41):

For example, drugs could be incorporated in chitin based capsules (`chitosomes`). The concomitant presence of well defined amounts of human **chitinase** in the capsule could ensure a controlled **release** of drugs. A slow but gradual **release of drug** could particularly be envisioned when it is trapped in a chitin matrix. The use of the human enzyme in such a system would result in ultimate destruction of the chitin-based capsule and not elicit an immunological response. The drugs used in such a system could vary from small compounds to proteins and DNA fragments for the purpose of enzyme and gene therapy. Chitin (or analogues) is already employed as a carrier for drugs (20).

US-PAT-NO: 5928928

DOCUMENT-IDENTIFIER: US 5928928 A

TITLE: Human chitinase, its recombinant production, its use for decomposing chitin, its use in therapy or prophylaxis against infection diseases

DATE-ISSUED: July 27, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Aerts; Johannes Maria Franciscus Gerardus	Abcoude	N/A	N/A	NL

APPL-NO: 08/ 486839

DATE FILED: June 7, 1995

US-CL-CURRENT: 435/201, 435/183 , 530/350 , 536/23.1 , 536/24.3

ABSTRACT:

A new human chitinase having an amino acid sequence as shown in FIG. 1 or FIG. 2. Modified forms of it having a similar chitin-hydrolyzing activity, and antigenic peptides representing one of its epitopes. Recombinant production of the human chitinase by genetically engineered hosts or host cells. Recombinant nucleic acid encoding it, and human chitinase-specific oligonucleotides. Use for therapeutic or prophylactic treatment of humans against infection by chitin-containing pathogens, or for decomposing chitin, e.g. from chitin-based articles. Antibodies binding to the human chitinase. Diagnostic test kits comprising the human chitanase, its antigenic peptides, human chitinase antibodies, recombinant nucleic acid or oligonucleotides.

24 Claims, 5 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 5

---------- KWIC ---------

Brief Summary Text - BSTX (59):

Furthermore, this invention provides chitin-based articles of manufacture comprising a chitin-hydrolyzing amount of the new human **chitinase**. E.g., the chitin-based article of manufacture may be **drug**-containing **drug** carrier or **implant** for controlled **drug release,** or a transient functional **implant**.

Detailed Description Text - DETX (40):

For example, drugs could be incorporated in chitin based capsules (`chitosomes`). The concomitant presence of well defined amounts of human **chitinase** in the capsule could ensure a controlled **release** of drugs. A slow but gradual **release of drug** could particularly be envisioned when it is trapped in a chitin matrix. The use of the human enzyme in such a system would result in ultimate destruction of the chitin-based capsule and not elicit an immunological response. The drugs used in such a system could vary from small compounds to proteins and DNA fragments for the purpose of enzyme and gene therapy. Chitin (or analogues) is already employed as a carrier for drugs (20).

	L #	Hits	Search Text	DBs	Time Stamp
1	L1	1916	chitinase$1 or chitotriosidase$1	USPAT; US-PGPUB	2003/09/29 08:23
2	L2	32	1 near4 human	USPAT; US-PGPUB	2003/09/29 08:23
3	L3	50	1 same (culture adj medi$4)	USPAT; US-PGPUB	2003/09/29 08:48
4	L4	76	1 same (cosemetic$1 or dental or toothpaste$1 or food)	USPAT; US-PGPUB	2003/09/29 09:13
5	L5	185	1 same antifung$	USPAT; US-PGPUB	2003/09/29 09:13
6	L6	17151	1near5 antifung$	USPAT; US-PGPUB	2003/09/29 09:14
7	L7	80	1 near5 antifung$	USPAT; US-PGPUB	2003/09/29 09:33
8	L8	16	5 same (human or mammal$)	USPAT; US-PGPUB	2003/09/29 09:33

	L #	Hits	Search Text	DBs	Time Stamp
1	L1	1916	chitinase$1 or chitotriosidase$1	USPAT; US-PGPUB	2003/09/29 08:23
2	L2	32	1 near4 human	USPAT; US-PGPUB	2003/09/29 08:23

PGPUB-DOCUMENT-NUMBER: 20030175932

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20030175932 A1

TITLE: Family 19 class IV chitinase gene from yam

PUBLICATION-DATE: September 18, 2003

US-CL-CURRENT: 435/200, 536/23.2

APPL-NO: 10/ 374534

DATE FILED: February 26, 2003

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	DOC-ID	APPL-DATE
JP	55222/2002	2002JP-55222/2002	March 1, 2002

PGPUB-DOCUMENT-NUMBER: 20030172043

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20030172043 A1

TITLE: Methods of identifying patterns in biological systems and uses thereof

PUBLICATION-DATE: September 11, 2003

US-CL-CURRENT: 706/48

APPL-NO: 10/ 057849

DATE FILED: January 24, 2002

RELATED-US-APPL-DATA:

child 10057849 A1 20020124

parent continuation-in-part-of 09633410 20000807 US PENDING

child 10057849 A1 20020124

parent continuation-in-part-of 09578011 20000524 US PENDING

child 10057849 A1 20020124

parent continuation-in-part-of 09568301 20000509 US GRANTED

parent-patent 6427141 US

child 10057849 A1 20020124

parent continuation-of 09303387 19990501 US GRANTED

parent-patent 6128608 US

non-provisional-of-provisional 60263696 20010124 US

non-provisional-of-provisional 60298757 20010615 US

non-provisional-of-provisional 60275760 20010314 US

non-provisional-of-provisional 60083961 19980501 US

RELATED APPLICATIONS

[0001] The present application claims priority of each of U.S. Provisional Patent Application Serial No. 60/263,696, filed Jan. 24, 2001, U.S.

Provisional Patent Application Serial No. 60/298,757, filed Jun. 15, 2001, and U.S. Provisional Patent Application Serial No. 60/275,760, filed Mar. 14, 2001, and is a continuation-in-part of U.S. patent applications Ser. Nos. 09/633,410, filed Aug. 7, 2000, which is a continuation-in-part of application Ser. No. 09/578,011, filed May 24, 2000, which is a continuation-in-part of application Ser. No. 09/568,301, filed May 9, 2000, now issued as Pat. No. _____, which is a continuation of application Ser. No. 09/303,387. filed May 1, 1999, now issued as Pat. No. 6,128,608, which claims priority to U.S. provisional application Serial No. 60/083,961, filed May 1, 1998. This application is related to applications Ser. No. 09/633,615, Ser. No. 09/633,616, and Ser. No. 09/633,850, all filed Aug. 7, 2000, which are also continuations-in-part of application Ser. No. 09/578,011. This application is also related to applications Ser. No. 09/303,386 and Ser. No. 09/305,345, now issued as Pat. No. 6,157,921, both filed May 1, 1999, and to application Ser. No. 09/715,832, filed Nov. 14, 2000, all of which also claim priority to provisional application Serial No. 60/083,961.

PGPUB-DOCUMENT-NUMBER: 20030143216

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20030143216 A1

TITLE: Chitinase chitin-binding fragments

PUBLICATION-DATE: July 31, 2003

US-CL-CURRENT: 424/94.61, 435/200 , 435/320.1 , 435/325 , 435/69.1 , 435/7.31 , 536/23.2

APPL-NO: 10/ 161547

DATE FILED: June 3, 2002

RELATED-US-APPL-DATA:

child 10161547 A1 20020603

parent division-of 09267574 19990312 US GRANTED

parent-patent 6399571 US

child 09267574 19990312 US

parent continuation-in-part-of 09039198 19980312 US GRANTED

parent-patent 6200951 US

[0001] This application is a continuation-in-part of U.S. Ser. No. 09/039,198 filed Mar. 12, 1998.

PGPUB-DOCUMENT-NUMBER: 20030104393

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20030104393 A1

TITLE: Blood assessment of injury

PUBLICATION-DATE: June 5, 2003

US-CL-CURRENT: 435/6

APPL-NO: 09/ 996275

DATE FILED: November 28, 2001

RELATED-US-APPL-DATA:

non-provisional-of-provisional 60253568 20001128 US

RELATED APPLICATION

[0001] This application claims priority under 35 U.S.C. .sctn.119 of U.S. Provisional Application Serial No. 60/253,568 filed Nov. 28, 2000.

PGPUB-DOCUMENT-NUMBER: 20030087414

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20030087414 A1

TITLE: Mammalian mucinase, its recombinant production, and its use in therapy or prophylaxis against diseases in which mucus is involved or infectious diseases

PUBLICATION-DATE: May 8, 2003

US-CL-CURRENT: 435/226, 424/94.2 , 424/94.63

APPL-NO: 10/ 004219

DATE FILED: November 2, 2001

PGPUB-DOCUMENT-NUMBER: 20030064437

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20030064437 A1

TITLE: Expression system for recombinant proteins

PUBLICATION-DATE: April 3, 2003

US-CL-CURRENT: 435/69.1, 435/196 , 435/200 , 435/226 , 435/254.23 , 435/320.1 , 536/23.2

APPL-NO: 10/ 045507

DATE FILED: November 7, 2001

RELATED-US-APPL-DATA:

non-provisional-of-provisional 60248806 20001115 US

PGPUB-DOCUMENT-NUMBER: 20030049261

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20030049261 A1

TITLE: Methods, compositions and kits relating to chitinases and chitinase-like molecules and inflammatory disease

PUBLICATION-DATE: March 13, 2003

US-CL-CURRENT: 424/146.1, 514/19 , 514/23 , 514/249 , 514/251 , 514/44 , 514/634

APPL-NO: 10/ 202436

DATE FILED: July 23, 2002

RELATED-US-APPL-DATA:

non-provisional-of-provisional 60307432 20010724 US

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is entitled to priority pursuant to 35 U.S.C. .sctn.119(e) to U.S. Provisional Patent Application No. 60/307,432, which was filed on Jul. 24, 2001.

PGPUB-DOCUMENT-NUMBER: 20030017570

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20030017570 A1

TITLE: CHITINASE MATERIALS AND METHODS

PUBLICATION-DATE: January 23, 2003

US-CL-CURRENT: 435/196, 435/320.1 , 435/325 , 435/69.1

APPL-NO: 08/ 663618

DATE FILED: June 14, 1996

CONTINUED PROSECUTION APPLICATION: This is a publication of a continued prosecution application (CPA) filed under 37 CFR 1.53(d).

PGPUB-DOCUMENT-NUMBER: 20030003114

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20030003114 A1

TITLE: Enzyme-based anti-cancer compositions and methods

PUBLICATION-DATE: January 2, 2003

US-CL-CURRENT: 424/400

APPL-NO: 10/ 104475

DATE FILED: March 22, 2002

RELATED-US-APPL-DATA:

non-provisional-of-provisional 60278026 20010322 US

[0001] This application claims priority from U.S. Provisional Patent Application Serial No. 60/278,026, which was filed on Mar. 22, 20001.

PGPUB-DOCUMENT-NUMBER: 20020155541

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020155541 A1

TITLE: Method and system for providing real-time, in situ biomanufacturing process monitoring and control in response to IR spectroscopy

PUBLICATION-DATE: October 24, 2002

US-CL-CURRENT: 435/69.1, 435/235.1 , 702/19

APPL-NO: 10/ 114469

DATE FILED: April 3, 2002

RELATED-US-APPL-DATA:

child 10114469 A1 20020403

parent division-of 09616894 20000714 US GRANTED

parent-patent 6395538 US

non-provisional-of-provisional 60157863 19991006 US

non-provisional-of-provisional 60151918 19990901 US

non-provisional-of-provisional 60144071 19990716 US

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims benefit to the filing dates of U.S. Provisional Application No. 60/157,863, filed Oct. 6, 1999, U.S. Provisional Application No. 60/151,918, filed Sep. 1, 1999, and U.S. Provisional Application No. 60/144,071, filed Jul. 16, 1999, each of which is incorporated by reference herein in its entirety.

PGPUB-DOCUMENT-NUMBER: 20020119452

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020119452 A1

TITLE: Osteoarthritis tissue derived nucleic acids, polypeptides, vectors, and cells

PUBLICATION-DATE: August 29, 2002

US-CL-CURRENT: 435/6, 435/183 , 435/320.1 , 435/325 , 536/23.2 , 702/20 , 800/8

APPL-NO: 09/ 765231

DATE FILED: January 18, 2001

RELATED-US-APPL-DATA:

non-provisional-of-provisional 60176523 20000118 US

[0001] The present application claims priority under Title 35, United States Code, .sctn.119 of U.S. Provisional application Serial No. 60/176,523 filed Jan. 01, 2000.

PGPUB-DOCUMENT-NUMBER: 20020090373

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020090373 A1

TITLE: ADAMTS polypeptides, nucleic acids encoding them, and uses thereof

PUBLICATION-DATE: July 11, 2002

US-CL-CURRENT: 424/146.1, 435/226 , 435/320.1 , 435/325 , 435/6 , 435/69.1

APPL-NO: 09/ 972467

DATE FILED: October 5, 2001

RELATED-US-APPL-DATA:

child 09972467 A1 20011005

parent continuation-of 09808208 20010314 US PENDING

non-provisional-of-provisional 60191382 20000322 US

PGPUB-DOCUMENT-NUMBER: 20020086008

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020086008 A1

TITLE: **Human chitinase,** its recombinant production, its use for decomposing chitin, its use in therapy or prophylaxis against infection diseases

PUBLICATION-DATE: July 4, 2002

US-CL-CURRENT: 424/94.61, 435/200 , 435/320.1 , 435/325 , 435/69.1 , 536/23.2

APPL-NO: 09/ 977827

DATE FILED: October 15, 2001

RELATED-US-APPL-DATA:

child 09977827 A1 20011015

parent continuation-of 09343623 19990630 US GRANTED

parent-patent 6303118 US

US-PAT-NO: 6607879

DOCUMENT-IDENTIFIER: US 6607879 B1

TITLE: Compositions for the detection of blood cell and immunological response gene expression

DATE-ISSUED: August 19, 2003

US-CL-CURRENT: 435/6, 435/69.1 , 536/23.1 , 536/24.1 , 536/24.3 , 536/24.31 , 536/24.32 , 536/24.33

APPL-NO: 09/ 023655

DATE FILED: February 9, 1998

US-PAT-NO: 6579684

DOCUMENT-IDENTIFIER: US 6579684 B2

TITLE: Assay of YKL-40 as a marker for cancer

DATE-ISSUED: June 17, 2003

US-CL-CURRENT: 435/7.23, 424/174.1 , 435/4 , 435/7.1 , 435/7.4 , 435/7.92 , 436/501 , 436/518 , 436/525 , 436/63 , 436/64 , 436/808 , 436/813 , 530/387.9 , 530/388.1 , 530/388.85 , 530/389.7

APPL-NO: 09/ 262213

DATE FILED: March 4, 1999

PARENT-CASE:

RELATED U.S. PATENT APPLICATIONS

This is a continuation of U.S. Ser. No. 08/581,527, now U.S. Pat. No. 5,935,798 filed on Apr. 17, 1996, which is a 371 national phase filing of PCT/US94/07754, filed on Jul. 8, 1994, which is a continuation-in-part of U.S. Ser. No. 08/089,989, filed on Jul. 9, 1993, now abandoned, all of which are herein incorporated by reference for all purposes.

US-PAT-NO: 6576427

DOCUMENT-IDENTIFIER: US 6576427 B1

TITLE: Human cartilage glycoprotein

DATE-ISSUED: June 10, 2003

US-CL-CURRENT: 435/7.1, 435/331 , 436/501 , 530/387.3 , 530/387.5 , 530/387.9 , 530/388.1 , 530/388.15 , 530/389.1

APPL-NO: 08/ 850348

DATE FILED: May 2, 1997

PARENT-CASE:

RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional Application No. 60/016,532, filed May 3,1996.

US-PAT-NO: 6399571

DOCUMENT-IDENTIFIER: US 6399571 B1

TITLE: Chitinase chitin-binding fragments

DATE-ISSUED: June 4, 2002

US-CL-CURRENT: 514/12, 424/94.61 , 435/209 , 530/350

APPL-NO: 09/ 267574

DATE FILED: March 12, 1999

PARENT-CASE:

This application is a continuation-in-part of U.S. Ser. No. 09/039,198 filed Mar. 12, 1998, now U.S. Pat. No. 6,200,951.

US-PAT-NO: 6395538

DOCUMENT-IDENTIFIER: US 6395538 B1

TITLE: Method and system for providing real-time, in situ biomanufacturing process monitoring and control in response to IR spectroscopy

DATE-ISSUED: May 28, 2002

US-CL-CURRENT: 435/288.7, 435/173.1 , 435/173.7

APPL-NO: 09/ 616894

DATE FILED: July 14, 2000

PARENT-CASE:

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application claims benefit to the filing dates of U.S. Provisional Application No. 60/157,863, filed Oct. 6, 1999, U.S. Provisional Application No. 60/151,918, filed Sep. 1, 1999, and U.S. Provisional Application No. 60/144,071, filed Jul. 16, 1999, each of which is incorporated by reference herein in its entirety.

US-PAT-NO: 6372212

DOCUMENT-IDENTIFIER: US 6372212 B1
See image for Certificate of Correction

TITLE: Chitinase materials and methods

DATE-ISSUED: April 16, 2002

US-CL-CURRENT: 424/94.61, 435/209 , 536/23.2

APPL-NO: 08/ 877599

DATE FILED: June 16, 1997

PARENT-CASE:

This is a continuation-in-part of U.S. application Ser. No. 08/663,618 filed Jun. 14, 1996.

US-PAT-NO: 6335170

DOCUMENT-IDENTIFIER: US 6335170 B1

TITLE: Gene expression in bladder tumors

DATE-ISSUED: January 1, 2002

US-CL-CURRENT: 435/6, 435/91.1 , 435/91.2 , 536/23.1 , 536/24.3 , 536/24.31 , 536/24.33

APPL-NO: 09/ 510643

DATE FILED: February 22, 2000

PARENT-CASE:

This application claims the benefit of U.S. Provisional Application No. 60/121,124, filed Feb. 22, 1999, which is hereby incorporated by reference in its entirety.

US-PAT-NO: 6303118

DOCUMENT-IDENTIFIER: US 6303118 B1
See image for Certificate of Correction

TITLE: **Human chitinase,** its recombinant production, its use for decomposing chitin, its use in therapy or prophylaxis against infection diseases

DATE-ISSUED: October 16, 2001

US-CL-CURRENT: 424/94.61, 435/209 , 536/23.2

APPL-NO: 09/ 343623

DATE FILED: June 30, 1999

PARENT-CASE:

This application is a divisional application of U.S. Ser. No. 08/486,839 filed on Jun. 7, 1995, issued as U.S. Pat. No. 5,928,928.

US-PAT-NO: 6221591

DOCUMENT-IDENTIFIER: US 6221591 B1
See image for Certificate of Correction

TITLE: Determination of a genetic risk factor for infection and other diseases, and detection of activated phagocytes

DATE-ISSUED: April 24, 2001

US-CL-CURRENT: 435/6, 435/201 , 536/23.1 , 536/24.3

APPL-NO: 09/ 156856

DATE FILED: September 18, 1998

PARENT-CASE:

RELATED PATENT APPLICATIONS

This patent application is a continuation-in-part of U.S. patent application Ser. No. 08/486,839 filed on Jun. 17, 1995 and now U.S. Pat. No. 5,928,928.

US-PAT-NO: 6200951

DOCUMENT-IDENTIFIER: US 6200951 B1
See image for Certificate of Correction

TITLE: Chitinase chitin-binding fragments

DATE-ISSUED: March 13, 2001

US-CL-CURRENT: 514/2, 435/183 , 435/196 , 435/209 , 435/7.8 , 530/324 , 530/350

APPL-NO: 09/ 039198

DATE FILED: March 12, 1998

US-PAT-NO: 6184027

DOCUMENT-IDENTIFIER: US 6184027 B1

TITLE: Isolation and purification of eubacteria and fungus with catalytically inactive murein binding enzymes

DATE-ISSUED: February 6, 2001

US-CL-CURRENT: 435/261

APPL-NO: 09/ 262419

DATE FILED: March 4, 1999

PARENT-CASE:

This is a continuation-in-part application of U.S. patent application Ser. No. 08/823,293 filed Mar. 21, 1997 (now U.S. Pat. No. 5,935,804).

US-PAT-NO: 6177447

DOCUMENT-IDENTIFIER: US 6177447 B1

TITLE: Deoxynojirimycin derivatives and their uses as glucosylceramidase inhibitors

DATE-ISSUED: January 23, 2001

US-CL-CURRENT: 514/319, 546/195

APPL-NO: 09/ 230005

DATE FILED: April 30, 1999

PARENT-CASE:

This application is filed under 35 U.S.C. .sctn. 371 as a nation phase application of PCT application number PCT/NL97/00411 filed on Jul. 14, 1997.

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
EP	96202010	July 15, 1996

PCT-DATA:
APPL-NO: PCT/NL97/00411
DATE-FILED: July 14, 1997
PUB-NO: WO98/02161
PUB-DATE: Jan 22, 1998
371-DATE: Apr 30, 1999
102(E)-DATE:Apr 30, 1999

US-PAT-NO: 6159719

DOCUMENT-IDENTIFIER: US 6159719 A

TITLE: Pan-bacterial and pan-fungal identification reagents and methods of use thereof

DATE-ISSUED: December 12, 2000

US-CL-CURRENT: 435/206, 435/18 , 435/7.1

APPL-NO: 09/ 261665

DATE FILED: March 3, 1999

PARENT-CASE:

This application is a division of U.S. patent application Ser. No. 08/823,293 filed Mar. 21, 1997, now U.S. Pat. No. 5,935,804.

US-PAT-NO: 6090573

DOCUMENT-IDENTIFIER: US 6090573 A

TITLE: Detecting eubacteria and fungus and determining their antibiotic sensitivity by using catalytically inactive murein binding enzymes

DATE-ISSUED: July 18, 2000

US-CL-CURRENT: 435/32, 435/18 , 435/206 , 435/29 , 435/34

APPL-NO: 09/ 261664

DATE FILED: March 3, 1999

PARENT-CASE:

This application is a continuation of U.S. patent application Ser. No. 08/823,293, filed Mar. 21, 1997, now U.S. Pat. No. 5,935,804.

US-PAT-NO: 6057142

DOCUMENT-IDENTIFIER: US 6057142 A
See image for Certificate of Correction

TITLE: **Human chitinase,** its recombinant production, its use for decomposing chitin, its use in therapy or prophylaxis against infection diseases

DATE-ISSUED: May 2, 2000

US-CL-CURRENT: 435/209, 435/252.3 , 435/320.1 , 435/325 , 536/23.2

APPL-NO: 09/ 151011

DATE FILED: September 10, 1998

PARENT-CASE:

This is a division application of application Ser. No. 08/486,839 filed Jun. 17, 1995 now U.S. Pat. No. 5,928,928.

US-PAT-NO: 5935804

DOCUMENT-IDENTIFIER: US 5935804 A

TITLE: Method for detecting eubacteria in biological samples with catalytically inactive murein binding enzymes

DATE-ISSUED: August 10, 1999

US-CL-CURRENT: 435/18, 435/206 , 435/29

APPL-NO: 08/ 823293

DATE FILED: March 21, 1997

US-PAT-NO: 5928928

DOCUMENT-IDENTIFIER: US 5928928 A

TITLE: **Human chitinase,** its recombinant production, its use for decomposing chitin, its use in therapy or prophylaxis against infection diseases

DATE-ISSUED: July 27, 1999

US-CL-CURRENT: 435/201, 435/183 , 530/350 , 536/23.1 , 536/24.3

APPL-NO: 08/ 486839

DATE FILED: June 7, 1995

US-PAT-NO: 5843449

DOCUMENT-IDENTIFIER: US 5843449 A

TITLE: Proteins and novel peptides derived from autoantigen for use in immunotherapy of autoimmune diseases

DATE-ISSUED: December 1, 1998

US-CL-CURRENT: 424/185.1, 424/535 , 424/548 , 514/2 , 514/21 , 514/825 , 530/350 , 530/395

APPL-NO: 08/ 634493

DATE FILED: April 18, 1996

PARENT-CASE:

This application is a continuation-in-part of U.S. Ser. No. 08/619,645, filed Mar. 25, 1996, now U.S. Pat. No. 5,736,507.

US-PAT-NO: 5811535

DOCUMENT-IDENTIFIER: US 5811535 A

TITLE: Human cartilege gp39-like gene

DATE-ISSUED: September 22, 1998

US-CL-CURRENT: 536/23.5, 435/69.1 , 530/300 , 530/350 , 536/23.1

APPL-NO: 08/ 694915

DATE FILED: August 9, 1996

	L #	Hits	Search Text	DBs	Time Stamp
1	L1	1916	chitinase$1 or chitotriosidase$1	USPAT; US-PGPUB	2003/09/29 08:23
2	L2	32	1 near4 human	USPAT; US-PGPUB	2003/09/29 08:23
3	L3	50	1 same (culture adj medi$4)	USPAT; US-PGPUB	2003/09/29 08:48
4	L4	76	1 same (cosemetic$1 or dental or toothpaste$1 or food)	USPAT; US-PGPUB	2003/09/29 09:13
5	L5	185	1 same antifung$	USPAT; US-PGPUB	2003/09/29 09:13
6	L6	17151	1near5 antifung$	USPAT; US-PGPUB	2003/09/29 09:14
7	L7	80	1 near5 antifung$	USPAT; US-PGPUB	2003/09/29 09:33
8	L8	16	5 same (human or mammal$)	USPAT; US-PGPUB	2003/09/29 09:33

PGPUB-DOCUMENT-NUMBER: 20020086008

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020086008 A1

TITLE: Human chitinase, its recombinant production, its use for decomposing chitin, its use in therapy or prophylaxis against infection diseases

PUBLICATION-DATE: July 4, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Aerts, Johannes Maria Franciscus Gerardus	Abcoude		NL	

APPL-NO: 09/ 977827

DATE FILED: October 15, 2001

RELATED-US-APPL-DATA:

child 09977827 A1 20011015

parent continuation-of 09343623 19990630 US GRANTED

parent-patent 6303118 US

US-CL-CURRENT: 424/94.61, 435/200 , 435/320.1 , 435/325 , 435/69.1 , 536/23.2

ABSTRACT:

A human chitinase, its recombinant production, its use for decomposing chitin, its use in therapy or prophylaxis against infection diseases
A new human chitinase having an amino acid sequence as shown in FIG. 1 or FIG. 2. Modified forms of it having a similar chitin-hydrolyzing activity, and antigenic peptides representing one of its epitopes. Recombinant production of the human chitinase by genetically engineered hosts or host cells. Recombinant nucleic acid encoding it, and human chitinase-specific oligonucleotides. Use for therapeutic or prophylactic treatment of humans against infection by chitin-containing pathogens, or for decomposing chitin, e.g. from chitin-based articles. Antibodies binding to the human chitinase. Diagnostic test kits comprising the human chitinase, its antigenic peptides, human chitinase antibodies, recombinant nucleic acid or oligonucleotides.

---------- KWIC ---------

Detail Description Paragraph - DETX (83):

[0160] To test whether **human chitotriosidase** can exert an **antifungal** action, a chitinous fungus (Mucor mucedo) was grown on plates (containing malt extract, peptone, glucose and agar) under a Cellophane membrane in order to keep the hyphae flat against the agar surface (see ref.16) . Individual sectors were cut out and mounted on microscope slides. Purified chitozyme 50 and chitozyme 39 were dialysed against 0.15 M sodium chloride. Samples of enzyme-containing solutions, and 0.15 M NaCl were pipetted on the hyphal tips. Microscopical analysis revealed that application of enzyme resulted in immediate cessation of hyphal growth, followed by a distorted morphological appearance. Application of saline had no effect. Negative effects on hyphal growth were detectable using chitozyme solutions with a concentration of enzyme as little as 0.005 mg/ml.

PGPUB-DOCUMENT-NUMBER: 20020048573

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020048573 A1

TITLE: Lytic enzymes useful for treating fungal infections

PUBLICATION-DATE: April 25, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Klock, John C.	Nicasio	CA	US	
Mishra, Chittra	Southborough	MA	US	
Starr, Christopher M.	Sonoma	CA	US	

APPL-NO: 09/ 932558

DATE FILED: August 17, 2001

RELATED-US-APPL-DATA:

child 09932558 A1 20010817

parent continuation-in-part-of 09078208 19980513 US ABANDONED

US-CL-CURRENT: 424/94.1, 424/405

ABSTRACT:

The present invention features methods of treating fungal infections in mammals including humans by administering one or more lytic enzymes and compositions comprising the same. The present invention further features a new method for isolating and purifying lytic enzymes to a degree of purity acceptable for treating fungal infections, including invasive Aspergillosis.

[0001] This application is a continuation-in-part of U.S. patent application Ser. No. 09/078,208, filed on May 13, 1998.

---------- KWIC ---------

Summary of Invention Paragraph - BSTX (15):

[0014] A variety of glucanases, **chitinases,** proteases and other hydrolytic enzymes produced by Trichoderma species have been implicated in the biological control of plant fungal pathogens. U.S. Pat. No. 4,062,941 discloses a method for treating fungal infections in animals by administering a fungal lytic enzyme extracted from Coprimus or Lycoperdon, with or without an antimycotic agent, such as amphotericin B, nystatin, or griseofulvin. This and all other U.S. patents cited herein are hereby specifically incorporated

herein by reference in their entirety. Pope and Davies (Postgraduate Medical J. 55:674-676 (1979)) teach a method of treating systemic fungal infections in mice by administering fungal lytic enzymes obtained from Coprinus comatus, Physarum polycephalum, and Lycoperdon pyriforme alone or in conjunction with conventional antimycotic drugs such as amphotericin B. Chalkley, et al. (Sabouraudia: J. Med. Vet. Mycol. 23:147-164 (1985)) discloses in vitro **antifungal** activity of mycolases comprising **chitinase,** .beta.1,3-glucanase, and exo-glycosidases from Physarum polycephalum against Candida pseudotropicalis and Candida albicans, but only slight enhancement of amphotericin B treatment of mice systemically infected with Candida albicans. In two **human** subjects infected with pulmonary coccidioidomycosis and one patient with Aspergillus pulmonary and mediastinal infection, mycolases administered with amphotericin B was not effective in eliminating the fungal infections. International Patent Application No. WO 94/13784 discloses an **antifungal** composition comprising a fungal cell wall degrading enzyme, such as endochitinases, chitin 1,4-.beta.-chitobiosidases, glucan 1,3-.beta.-glucosidases and cellulases, together with a non-enzymatic fungicide, and a method of inhibiting the replication, germination, or growth of a chitin- and 1,3-.beta.-glucan-containing fungus, such as Botrytis cinerea. International Patent Application No. WO 95/31534 and U.S. Pat. Nos. 5,770,406 and 6,022,723 disclose a DNA construct encoding .beta.1,6-endo-glucanase activity, a method of producing said enzyme, a preparation of said enzyme, and a method of using said enzyme in degradation or modification of .beta.-glucan-containing materials. However, no studies have shown the therapeutically effective use of the lytic enzymes isolated from Trichoderms, such as .beta.1,6-glucanase or chitobiosidase, for the in vivo treatment of fungal infection, including invasive Aspergillosis. The treatment based on these lytic enzymes disclosed herein offers a new approach to fighting fungal infections, especially against the more invasive and resistant fungal infections, such as Aspergillosis. Because humans and animals are not known to have glucan or chitin structures like those of lower animals and microbes, glucanases, **chitinases** and proteases should not display significant toxicity or undesirable biologic effects in humans or animals.

PGPUB-DOCUMENT-NUMBER: 20010014732

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20010014732 A1

TITLE: Biocidal proteins

PUBLICATION-DATE: August 16, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Broekaert, Willem F.	Dilbeek		BE	
Cammue, Bruno P.A.	Alsemberg		BE	
Osborn, Rupert W.	Middlesex		GB	
Rees, Sarah B.	Berkshire		GB	
Terras, Franky R.G.	Amzegem		BE	
Vanderleyden, Jozef	Heverlee		BE	

APPL-NO: 09/ 759584

DATE FILED: January 12, 2001

RELATED-US-APPL-DATA:

child 09759584 A1 20010112

parent continuation-of 08971982 19971117 US GRANTED

parent-patent 6187904 US

child 08971982 19971117 US

parent continuation-of 08452078 19950526 US GRANTED

parent-patent 5689043 US

child 08452078 19950526 US

parent division-of 08377687 19950125 US GRANTED

parent-patent 5538525 US

child 08377687 19950125 US

parent continuation-of 08002480 19930104 US ABANDONED

child 08002480 19930104 US

parent continuation-of PCT/GB92/01570 19920827 US UNKNOWN

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	DOC-ID	APPL-DATE
GB	9118523.1	1991GB-9118523.1	August 29, 1991
GB	9203038.6	1992GB-9203038.6	February 13, 1992
GB	9213526.8	1992GB-9213526.8	June 25, 1992

US-CL-CURRENT: 530/324, 536/23.6

ABSTRACT:

Biocidal proteins isolated from seeds have been characterized, in particular proteins isolated from members of the Brassicaceae, Compositae and Leguminosae families including Raphanus, Brassica, Sinapis, Arabidopsis, Dahlia, Cnicus, Lathyrus and Clitoria. The proteins show a wide range of antifungal activity and some are active against Gram-positive bacteria. All share a common amino acid sequence. DNA encoding the proteins has been isolated and incorporated into vectors. Plants transformed with this DNA may be produced. The proteins find commercial application as antifungal or antibacterial agents; transformed plants will show increased disease-resistance.

---------- KWIC ---------

Summary of Invention Paragraph - BSTX (7):

[0007] These proteins have gained considerable attention as they could potentially be used as biocontrol agents. The **chitinases** and beta-1,3-glucanases have weak activities by themselves, and are only inhibitory to plant pathogens when applied in combination (Mauch et al, 1988, Plant Physiol, 88, 936-942). The chitin-binding lectins can also be classified as rather weak **antifungal** factors (Broekaert et al, 1989, Science, 245, 1100-1102; Van Parijs et al, 1991, Planta, 183, 258-264). Zeamatin is a more potent **antifungal** protein but its activity is strongly reduced by the presence of ions at physiological concentrations (Roberts and Selitnermikoff, 1990, G Gen Microbiol, 136, 2150-2155). Finally, thionins and ribosome-inactivating proteins are potentially hazardous since they are known to be toxic for **human** cells (Carrasco et al, 1981, Eur J Biochem, 116, 185-189; Vernon et al, 1985, Arch Biochem Biophys, 238, 18-29; Stirpe and Barbieri, 1986, FEBS Lett, 195, 1-8).

US-PAT-NO: 6187904

DOCUMENT-IDENTIFIER: US 6187904 B1

TITLE: Biocidal proteins

DATE-ISSUED: February 13, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Broekaert; Willem F.	Dilbeek	N/A	N/A	BE
Cammue; Bruno P. A.	Alsemberg	N/A	N/A	BE
Osborn; Rupert W.	Middlesex	N/A	N/A	GB
Rees; Sarah B.	Berkshire	N/A	N/A	GB
Terras; Franky R. G.	Amzegem	N/A	N/A	BE
Vanderleyden; Jozef	Heverlee	N/A	N/A	BE

APPL-NO: 08/ 971982

DATE FILED: November 17, 1997

PARENT-CASE:

This is a continuation of application Ser. No. 08/452,078, filed May 26, 1995 now U.S. Pat. No. 5,689,043, which is a Division of application Ser. No. 08/377,687, filed Jan. 25, 1995, U.S. Pat. No. 5,538,525, which is a Continuation of application Ser. No. 08/002,480, filed Jan. 4, 1993, now abandoned, which is a Continuation of PCT/GB92/01570, filed Aug. 27, 1992, now abandoned.

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
GB	9118523	August 29, 1991
GB	9203038	February 13, 1992
GB	9213526	June 25, 1992

US-CL-CURRENT: 530/324, 530/326 , 530/350

ABSTRACT:

Biocidal proteins isolated from seeds have been characterised, in particular proteins isolated from members of the Brassicaceae, Compositae and Leguminosae families including Raphanus, Brassica, Sinapis, Arabidopsis, Dahlia, Cnicus, Lathyrus and Clitoria. The proteins show a wide range of antifungal activity and some are active against Gram-positive bacteria. All share a common amino acid sequence. DNA encoding the proteins has been isolated and incorporated into vectors. Plants transformed with this DNA may be produced. The proteins find commercial application as antifungal or antibacterial agents; transformed plants will show increased disease-resistance.

2 Claims, 60 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 39

---------- KWIC ---------

Brief Summary Text - BSTX (7):

These proteins have gained considerable attention as they could potentially be used as biocontrol agents. The **chitinases** and beta-1,3-glucanases have weak activities by themselves, and are only inhibitory to plant pathogens when applied in combination (Mauch et al, 1988, Plant Physiol, 88, 936-942). The chitin-binding lectins can also be classified as rather weak **antifungal** factors (Broekaert et al, 1989, Science, 245, 1100-1102; Van Parijs et al, 1991, Planta, 183, 258-264). Zeamatin is a more potent **antifungal** protein but its activity is strongly reduced by the presence of ions at physiological concentrations (Roberts and Selitnermikoff, 1990, G Gen Microbiol, 136, 2150-2155). Finally, thionins and ribosome-inactivating proteins are potentially hazardous since they are known to be toxic for **human** cells (Carrasco et al, 1981, Eur J Biochem, 116, 185-189; Vernon et al, 1985, Arch Biochem Biophys, 238, 18-29; Stirpe and Barbieri, 1986, FEBS Lett, 195, 1-8).

US-PAT-NO: 5981844

DOCUMENT-IDENTIFIER: US 5981844 A

TITLE: Synergistic antifungal protein and compositions containing same

DATE-ISSUED: November 9, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Roberts; Walden K.	Denver	CO	N/A	N/A
Selitrennikoff; Claude P.	Evergreen	CO	N/A	N/A
Laue; Bridget E.	Davis	CA	N/A	N/A
Potter; Sharon L.	Raleigh	NC	N/A	N/A

APPL-NO: 08/ 994418

DATE FILED: December 19, 1997

PARENT-CASE:

This Application is a Continuation of U.S. application Ser. No. 08/456,430 filed Jun. 1, 1995, now U.S. Pat. No. 5,703,044, which is a division of Ser. No. 08/178,708, filed Jan. 10, 1994, now U.S. Pat. No. 5,521,153, which is a Continuation-in-part of Ser. No. 07/505,781, filed Apr. 6, 1990, now abandoned, which is a Continuation in-Part of Ser. No. 07/104,755, filed Oct. 2, 1987, now abandoned. Such applications are herein incorporated by reference.

US-CL-CURRENT: 800/301, 435/320.1 , 435/419 , 800/279

ABSTRACT:

Novel plant proteins (SAFPs) which synergize the activity of antifungal antibiotics are identified. SAFPs are demonstrated to synergize antifungal antibiotics, such as nikkomycins, polyoxins and amphotericins. SAFPs alone also display antifungal activity against several species of fungi, including strains of Candida, Trichoderma, Neurospora and strains of the plant pathogens Fusarium, Rhizoctonia and Chaetomium. Synergistic antifungal compositions containing SAFP and antifungal antibiotics are provided. In particular, synergistic compositions of corn-SAFP (zeamatin), sorghum-SAFP (sormatin) or oat-SAFP (avematin) and nikkomycin are found to be effective as antifungal compositions, especially against the opportunistic human pathogen Candida albicans. Method for employing SAFPs and synergistic compositions containing them for the inhibition of fungi are provided. In addition, a method for purifying SAFP from grain meal is provided.

5 Claims, 13 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 10

---------- KWIC ---------

Detailed Description Text - DETX (4):

The present work is an extension of experiments with **antifungal** proteins (AFPs) which were isolated from barley, corn and wheat (Roberts and Selitrennikoff (1988) J. Gen. Microbiol. 134:169-176). These proteins inhibited growth of Trichoderma, Phycomyces and Alternaria and have been shown to have endochitinase activity. Wheat and barley AFP **chitinases** did not inhibit growth of Neurospora, in contrast to corn AFP preparations. Growth of the important **human** pathogen Candida albicans was found to be resistant to inhibition by the AFPs in agar plate assays. AFPs were then assessed to determine if they synergized with **antifungal** antibiotics to lower the MICs of the antibiotics. Selected results of such experiments are summarized in Table 1. Nikkomycin, a mixture of nikkomycin Z and X, synergized with all AFP preparations, but synergy was particularly dramatic with corn-AFP preparations. Polyoxin synergized significantly with corn and wheat AFP preparations, while modest synergy was observed with combinations of amphotericin and AFP preparations from barley and corn. In contrast, no synergy was observed with papulocandin and AFP preparations. Wheat and barley AFPs (Table 1) were purified to homogeneity. The corn-AFP preparation (Table 1) when chromatographed through a CM-Sephadex.TM. column was shown to contain multiple protein peaks (FIG. 1). Using synergy with nikkomycin to inhibit the growth of C albicans as an activity assay, the synergizing activity in corn-AFP preparations was found to reside in a single protein fraction from CM-Sephadex.TM. column chromatography, see FIG. 1. Further purification of this fraction using conventional hydrophobic column chromatography with phenyl-Sepharose.TM. resulted in the isolation of an approximately 22 kd protein. The 22 kd protein which effected strong enhancement of nikkomycin activity was designated a corn-SAFP, and specifically named zeamatin.

US-PAT-NO: 5824869

DOCUMENT-IDENTIFIER: US 5824869 A

TITLE: Biocidal proteins

DATE-ISSUED: October 20, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Broekaert; Willem F.	Dilbeek	N/A	N/A	BE
Cammue; Bruno P.A.	Alsemberg	N/A	N/A	BE
Osborn; Rupert W.	Middlesex	N/A	N/A	GB2
Rees; Sarah B.	Berkshire	N/A	N/A	GB2
Terras; Franky R.G.	Amzegem	N/A	N/A	BE
Vanderleyden; Jozef	Heverlee	N/A	N/A	BE

APPL-NO: 08/ 777192

DATE FILED: December 27, 1996

PARENT-CASE:

This is a division of application Ser. No. 08/452,078, filed May 26, 1995, now U.S. Pat. No 5,689,043, which is a division of application Ser. No. 08/377,687, filed Jan. 25, 1995, now U.S. Pat. No. 5,538,525, which is a continuation of application Ser No. 08/002,480, now abandoned, filed as a continuation of PCT/GB92/01570, filed Aug. 27, 1992, now abandoned.

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
GB	9118523	August 29, 1991
GB	9203038	February 13, 1992
GB	9213526	June 25, 1992

US-CL-CURRENT: 800/301, 435/418 , 435/419 , 435/69.1 , 536/23.6

ABSTRACT:

Biocidal proteins isolated from seeds have been characterised, in particular proteins isolated from members of the Brassicaceae, Compositae and Leguminosae families including Raphanus, Brassica, Sinapis, Arabidopsis, Dahlia, Cnicus, Lathyrus and Clitoria. The proteins show a wide range of antifungal activity and some are active against Gram-positive bacteria. All share a common amino acid sequence. DNA encoding the proteins has been isolated and incorporated into vectors. Plants transformed with this DNA may be produced. The proteins find commercial application as antifungal or antibacterial agents; transformed plants will show increased disease-resistance.

19 Claims, 42 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 39

---------- KWIC ---------

Brief Summary Text - BSTX (7):

These proteins have gained considerable attention as they could potentially be used as biocontrol agents. The **chitinases** and beta-1,3-glucanases have weak activities by themselves, and are only inhibitory to plant pathogens when applied in combination (Mauch et al, 1988, Plant Physiol, 88, 936-942). The chitin-binding lectins can also be classified as rather weak **antifungal** factors (Broekaert et al, 1989, Science, 245, 1100-1102; Van Parijs et al, 1991, Planta, 183, 258-264). Zeamatin is a more potent **antifungal** protein but its activity is strongly reduced by the presence of ions at physiological concentrations (Roberts and Selitnermikoff, 1990, G Gen Microbiol, 136, 2150-2155). Finally, thionins and ribosome-inactivating proteins are potentially hazardous since they are known to be toxic for **human** cells (Carrasco et al, 1981, Eur J Biochem, 116, 185-189; Vernon et al, 1985, Arch Biochem Biophys, 238, 18-29; Stirpe and Barbieri, 1986, FEBS Lett, 195, 1-8).

US-PAT-NO: 5776448

DOCUMENT-IDENTIFIER: US 5776448 A

TITLE: Chitinase-producing bacteria

DATE-ISSUED: July 7, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Suslow; Trevor V.	El Cerrito	CA	N/A	N/A
Jones; Jonathan D.G.	Norwich	N/A	N/A	GB

APPL-NO: 08/ 693835

DATE FILED: August 1, 1996

PARENT-CASE:

This application is a continuation of application Ser. No. 08/358,901, filed Dec. 19, 1994, which issued as Pat. No. 5,554,521, which is a continuation-in-part of application Ser. No. 07/930,970, filed Aug. 14, 1992, which issued as Pat. No. 5,290,687, which is a continuation of application Ser. No. 07/550,253, filed Jul. 9, 1990, which issued as Pat. No. 5,374,540, which is a continuation-in-part of application Ser. No. 06/888,033, filed Jul. 18, 1986, which issued as Pat. No. 4,940,840, which is a continuation-in-part of application Ser. No. 06/593,691, filed Mar. 26, 1984, which issued as Pat. No. 4,751,081, all in the names of Trevor V. Suslow and Jonathan D. G. Jones. All of the above are incorporated herein by reference.

US-CL-CURRENT: 424/93.2, 424/93.4 , 424/93.47 , 435/209 , 435/252.3 , 435/252.33 , 435/252.34 , 435/471 , 435/476 , 435/488 , 435/69.1 , 435/71.1 , 47/57.6 , 536/23.2 , 536/23.7

ABSTRACT:

Novel bacterial strains are described which produce and secrete chitinase as a result of the introduction of foreign DNA linked to a sequence encoding chitinase, an enzyme that degrades chitin. The bacterial strains can be used to provide protection for plants against chitinase sensitive plant pathogens. Methods of preparing the chitinase producing bacterial cells are also described. Methods of protecting plants from chitinase sensitive pathogens are also described.

22 Claims, 4 Drawing figures

Exemplary Claim Number: 5

Number of Drawing Sheets: 4

---------- KWIC ---------

Detailed Description Text - DETX (25):

The present invention can also be used in combination with the introduction of some other foreign DNA, that is foreign DNA other than **chitinase** DNA, into a bacteria or plant. For instance, in the case of rhizobacteria, such other foreign DNA could provide the host with some other form of anti-pathogen activity or with some other means to allow it to enhance the soil environment to the benefit of the plant. Another example is the introduction into a plant cell of a foreign gene attached to the nucleotide sequence encoding the signal peptide sequence of the **chitinase** A gene. Such foreign genes for introduction into a plant cell could be from a variety of sources (e.g., bacterial, plant, **mammalian,** yeast or fungal) and from a number of classes of genes, e.g., genes to protect plants against pathogens (including **antifungal** genes, e.g., cecropia, magainin, attacins or lysozymes); genes to protect plants against environmental stresses (such as antifreeze genes and salt tolerance genes); and genes to allow plant cells to produce desired pharmaceutical or other peptides, in particular where the peptide is to be overproduced for collection and purification (such as genes for growth hormones or insulin). The expressed polypeptide will then be released into the environment.

US-PAT-NO: 5703044

DOCUMENT-IDENTIFIER: US 5703044 A

TITLE: Synergistic antifungal protein and compositions containing same

DATE-ISSUED: December 30, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Roberts; Walden K.	Denver	CO	N/A	N/A
Selitrennikoff; Claude P.	Evergreen	CO	N/A	N/A
Laue; Bridget E.	Davis	CA	N/A	N/A
Potter; Sharon L.	Raleigh	NC	N/A	N/A

APPL-NO: 08/ 456430

DATE FILED: June 1, 1995

PARENT-CASE:

This is a divisional of application Ser. No. 08/178,708, filed Jan. 10, 1994, now U.S. Pat. No. 5,521,153, which is a continuation-in-part of Ser. No. 07/505,781, filed Apr. 6, 1990, now abandoned, which is a continuation-in-part of Ser. No. 07/104,755, filed Oct. 2, 1987, now abandoned.

US-CL-CURRENT: 514/12, 514/2 , 514/8 , 530/372 , 530/376

ABSTRACT:

Novel plant proteins (SAFPs) which synergize the activity of antifungal antibiotics are identified. SAFPs are demonstrated to synergize antifungal antibiotics, such as nikkomycins, polyoxins and amphotericins. SAFPs alone also display antifungal activity against several species of fungi, including strains of Candida, Trichoderma, Neurospora and strains of the plant pathogens Fusarium, Rhizoctonia and Chaetomium. Synergistic antifungal compositions containing SAFP and antifungal antibiotics are provided. In particular, synergistic compositions of corn-SAFP (zeamatin), sorghum-SAFP (sormatin) or oat-SAFP (avematin) and nikkomycin are found to be effective as antifungal compositions, especially against the opportunistic human pathogen Candida albicans. Method for employing SAFPs and synergistic compositions containing them for the inhibition of fungi are provided. In addition, a method for purifying SAFP from grain meal is provided.

26 Claims, 13 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 10

---------- KWIC ---------

Detailed Description Text - DETX (4):

The present work is an extension of experiments with **antifungal** proteins (AFPs) which were isolated from barley, corn and wheat (Roberts and Selitrennikoff (1988) J. Gen. Microbiol. 134:169-176). These proteins inhibited growth of Trichoderma, Phycomyces and Alternaria and have been shown to have endochitinase activity. Wheat and barley AFP **chitinases** did not inhibit growth of Neurospora, in contrast to corn AFP preparations. Growth of the important **human** pathogen Candida albicans was found to be resistant to inhibition by the AFPs in agar plate assays. AFPs were then assessed to determine if they synergized with **antifungal** antibiotics to lower the MICs of the antibiotics. Selected results of such experiments are summarized in Table 1. Nikkomycin, a mixture of nikkomycin Z and X, synergized with all AFP preparations, but synergy was particularly dramatic with corn-AFP preparations. Polyoxin synergized significantly with corn and wheat AFP preparations, while modest synergy was observed with combinations of amphotericin and AFP preparations from barley and corn. In contrast, no synergy was observed with papulocandin and AFP preparations. Wheat and barley AFPs (Table 1) were purified to homogeneity. The corn-AFP preparation (Table 1) when chromatographed through a CM-Sephadex.TM. column was shown to contain multiple protein peaks (FIG. 1). Using synergy with nikkomycin to inhibit the growth of C. albicans as an activity assay, the synergizing activity in corn-AFP preparations was found to reside in a single protein fraction from CM-Sephadex.TM. column chromatography, see FIG. 1. Further purification of this fraction using conventional hydrophobic column chromatography with phenyl-Sepharose.TM. resulted in the isolation of an approximately 22 kd protein. The 22 kd protein which effected strong enhancement of nikkomycin activity was designated a corn-SAFP, and specifically named zeamatin.

US-PAT-NO: 5689043

DOCUMENT-IDENTIFIER: US 5689043 A

TITLE: Biocidal proteins

DATE-ISSUED: November 18, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Broekaert; Willem F.	Dilbeek	N/A	N/A	BE
Cammue; Bruno P.A.	Alsemberg	N/A	N/A	BE
Osborn; Rupert W.	Middlesex	N/A	N/A	GB2
Rees; Sarah B.	Berkshire	N/A	N/A	GB2
Terras; Franky R.G.	Amzegem	N/A	N/A	BE
Vanderleyden; Jozef	Heverlee	N/A	N/A	BE

APPL-NO: 08/ 452078

DATE FILED: May 26, 1995

PARENT-CASE:

This is a division of application Ser. No. 08/377,687, filed Jan. 25, 1995, now U.S. Pat. 5,538,525 which is a continuation of application Ser. No. 08/002,480 filed Jan. 4, 1993, abandoned, which is a continuation of PCT/GB92/01570 filed Aug. 27, 1992.

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
GB	9118523	August 29, 1991
GB	9203038	February 13, 1992
GB	9213526	June 25, 1992

US-CL-CURRENT: 800/301, 435/252.3 , 435/320.1 , 435/418 , 435/419 , 536/23.6

ABSTRACT:

Biocidal proteins isolated from seeds have been characterised, in particular proteins isolated from members of the Brassicaceae, Compositae and Leguminosae families including Raphanus, Brassica, Sinapis, Arabidopsis, Dahlia, Cnicus, Lathyrus and Clitoria. The proteins show a wide range of antifungal activity and some are active against Gram-positive bacteria. All share a common amino acid sequence. DNA encoding the proteins has been isolated and incorporated into vectors. Plants transformed with this DNA may be produced. The proteins find commercial application as antifungal or antibacterial agents; transformed plants will show increased disease-resistance.

13 Claims, 44 Drawing figures

Exemplary Claim Number: 1,9

Number of Drawing Sheets: 39

---------- KWIC ---------

Brief Summary Text - BSTX (8):

These proteins have gained considerable attention as they could potentially be used as biocontrol agents. The **chitinases** and beta-1,3-glucanases have weak activities by themselves, and are only inhibitory to plant pathogens when applied in combination (Mauch et al, 1988, Plant Physiol, 88, 936-942). The chitin-binding lectins can also be classified as rather weak **antifungal** factors (Broekaert et al, 1989, Science, 245, 1100-1102; Van Parijs et al, 1991, Planta, 183, 258-264). Zeamatin is a more potent **antifungal** protein but its activity is strongly reduced by the presence of ions at physiological concentrations (Roberts and Selitnermikoff, 1990, G Gen Microbiol, 136, 2150-2155). Finally, thionins and ribosome-inactivating proteins are potentially hazardous since they are known to be toxic for **human** cells (Carrasco et al, 1981, Eur J Biochem, 116, 185-189; Vernon et al, 1985, Arch Biochem Biophys, 238, 18-29; Stirpe and Barbieri, 1986, FEBS Lett, 195, 1-8).

US-PAT-NO: 5633450

DOCUMENT-IDENTIFIER: US 5633450 A

TITLE: Chitinase-producing plants

DATE-ISSUED: May 27, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Suslow; Trevor V.	El Cerrito	CA	N/A	N/A
Jones; Jonathan D. G.	Norwich	N/A	N/A	GB

APPL-NO: 08/ 566347

DATE FILED: December 1, 1995

PARENT-CASE:

CROSS-REFERENCE TO RELATED APPLICATIONS

This is a Continuation of application Ser. No. 08/358,901 filed Dec. 19, 1994, now U.S. Pat. No. 5,554,521, which is a continuation-in-part of application Ser. No. 07/930,970, filed Aug. 14, 1992, now U.S. Pat. No. 5,290,687, which is a continuation of application U.S. Ser. No. 07/550,253, filed Jul. 9, 1990, which issued as U.S. Pat. No. 5,374,540 for CHITINASE-PRODUCING BACTERIA AND PLANTS, which is a continuation-in-part of application U.S. Ser. No. 06/888,033, filed Jul. 18, 1986, which issued as U.S. Pat. No. 4,940,840 for NOVEL CHITINASE-PRODUCING BACTERIA AND PLANTS, and which is a continuation-in-part of U.S. Ser. No. 06/593,691, filed Mar. 26, 1984, which issued as U.S. Pat. No. 4,751,081 for NOVEL CHITINASE-PRODUCING BACTERIA, all in the names of Trevor V. Suslow and Jonathan D. G. Jones. All of the above are incorporated herein by reference.

US-CL-CURRENT: 800/317.4, 435/100 , 435/105 , 435/209 , 435/69.1 , 435/69.7 , 435/70.1

ABSTRACT:

Novel plants are described which produce and secrete chitinase as the result of the introduction of foreign DNA linked to a sequence encoding chitinase, an enzyme capable of degrading chitin present in fungi and nematodes. Novel plants that are resistant to cold damage are also described which are created by introduction of DNA encoding for the production of chitinase. The plants of the invention may also have enhanced levels of reducing sugars or sweetness, or produce fruit having enhanced levels of reducing sugars or sweetness, or may be selected for enhanced post-harvest storage life.

12 Claims, 4 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 4

---------- KWIC ---------

Detailed Description Text - DETX (25):

The present invention can also be used in combination with the introduction of some other foreign DNA, that is foreign DNA other than **chitinase** DNA, into a bacteria or plant. For instance, in the case of rhizobacteria, such other foreign DNA could provide the host with some other form of anti-pathogen activity or with some other means to allow it to enhance the soil environment to the benefit of the plant. Another example is the introduction into a plant cell of a foreign gene attached to the nucleotide sequence encoding the signal peptide sequence of the **chitinase** A gene. Such foreign genes for introduction into a plant cell could be from a variety of sources (e.g., bacterial, plant, **mammalian,** yeast or fungal) and from a number of classes of genes, e.g., genes to protect plants against pathogens (including **antifungal** genes, e.g., cecropia, magainin, attacins or lysozymes); genes to protect plants against environmental stresses (such as antifreeze genes and salt tolerance genes); and genes to allow plant cells to produce desired pharmaceutical or other peptides, in particular where the peptide is to be overproduced for collection and purification (such as genes for growth hormones or insulin). The expressed polypeptide will then be released into the environment.

US-PAT-NO: 5559034

DOCUMENT-IDENTIFIER: US 5559034 A

TITLE: Synergistic antifungal protein and compositions containing same

DATE-ISSUED: September 24, 1996

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Roberts; Walden K.	Denver	CO	N/A	N/A
Selitrennikoff; Claude P.	Evergreen	CO	N/A	N/A
Laue; Bridget E.	Davis	CA	N/A	N/A
Potter; Sharon L.	Raleigh	NC	N/A	N/A

APPL-NO: 08/ 457552

DATE FILED: June 1, 1995

PARENT-CASE:

This is a divisional application of Ser. No. 08/178,708, filed Jan. 10, 1994, which is a continuation-in-part of Ser. No. 07,505,781, filed Apr. 6, 1990, now abandoned which is a continuation-in-part of Ser. No. 07/104,755, filed Oct. 2, 1987, now abandoned.

US-CL-CURRENT: 435/320.1, 435/252.3 , 435/69.1 , 514/12 , 514/2 , 514/8 , 530/372 , 530/376 , 536/22.1 , 536/23.1 , 536/23.6

ABSTRACT:

Novel plant proteins (SAFPs) which synergize the activity of antifungal antibiotics are identified. SAFPs are demonstrated to synergize antifungal antibiotics, such as nikkomycins, polyoxins and amphotericins. SAFPs alone also display antifungal activity against several species of fungi, including strains of Candida, Trichoderma, Neurospora and strains of the plant pathogens Fusarium, Rhizoctonia and Chaetomium. Synergistic antifungal compositions containing SAFP and antifungal antibiotics are provided. In particular, synergistic compositions of corn-SAFP (zeamatin), sorghum-SAFP (sormatin) or oat-SAFP (avematin) and nikkomycin are found to be effective as antifungal compositions, especially against the opportunistic human pathogen Candida albicans. Method for employing SAFPs and synergistic compositions containing them for the inhibition of fungi are provided. In addition, a method for purifying SAFP from grain meal is provided.

2 Claims, 13 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 10

---------- KWIC ---------

Detailed Description Text - DETX (4):

The present work is an extension of experiments with **antifungal** proteins (AFPs) which were isolated from barley, corn and wheat (Roberts and Selitrennikoff (1988) J. Gen. Microbiol. 134:169-176). These proteins inhibited growth of Trichoderma, Phycomyces and Alternaria and have been shown to have endochitinase activity. Wheat and barley AFP **chitinases** did not inhibit growth of Neurospora, in contrast to corn AFP preparations. Growth of the important **human** pathogen Candida albicanswas found to be resistant to inhibition by the AFPs in agar plate assays. AFPs were then assessed to determine if they synergized with **antifungal** antibiotics to lower the MICs of the antibiotics. Selected results of such experiments are summarized in Table 1. Nikkomycin, a mixture of nikkomycin Z and X, synergized with all AFP preparations, but synergy was particularly dramatic with corn-AFP preparations. Polyoxin synergized significantly with corn and wheat AFP preparations, while modest synergy was observed with combinations of amphotericin and AFP preparations from barley and corn. In contrast, no synergy was observed with papulocandin and AFP preparations. Wheat and barley AFPs (Table 1) were purified to homogeneity. The corn-AFP preparation (Table 1) when chromatographed through a CM-Sephadex.TM. column was shown to contain multiple protein peaks (FIG. 1). Using synergy with nikkomycin to inhibit the growth of C. albicans as an activity assay, the synergizing activity in corn-AFP preparations was found to reside in a single protein fraction from CM-Sephadex.TM. column chromatography, see FIG. 1. Further purification of this fraction using conventional hydrophobic column chromatography with phenyl-Sepharose.TM. resulted in the isolation of an approximately 22 kd protein. The 22 kd protein which effected strong enhancement of nikkomycin activity was designated a corn-SAFP, and specifically named zeamatin.

US-PAT-NO: 5554521

DOCUMENT-IDENTIFIER: US 5554521 A

TITLE: Chitinase-producing plants

DATE-ISSUED: September 10, 1996

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Suslow; Trevor V.	El Cerrito	CA	N/A	N/A
Jones; Jonathan D. G.	Norwich	N/A	N/A	GB

APPL-NO: 08/ 358901

DATE FILED: December 19, 1994

PARENT-CASE:

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation-in-part of application Ser. No. 07/930,970, filed Aug. 14, 1992, now U.S. Pat. No. 5,290,687, which is a continuation of application U.S. Ser. No. 07/550,253, filed Jul. 9, 1990, which issued as U.S. Pat. No. 5,374,540 for CHITINASE-PRODUCING BACTERIA AND PLANTS, which is a continuation-in-part of application U.S. Ser. No. 06/888,033, filed Jul. 18, 1986, which issued as U.S. Pat. No. 4,940,840 for NOVEL CHITINASE-PRODUCING BACTERIA AND PLANTS, and which is a continuation-in-part of U.S. Ser. No. 06/593,691, filed Mar. 26, 1984, which issued as U.S. Pat. No. 4,751,081 for NOVEL CHITINASE-PRODUCING BACTERIA, all in the names of Trevor V. Suslow and Jonathan D. G. Jones. All of the above are incorporated herein by reference.

US-CL-CURRENT: 800/284, 435/100 , 435/105 , 435/209 , 435/69.1 , 435/69.7 , 435/70.1 , 800/279 , 800/288 , 800/289

ABSTRACT:

Novel plants are described which produce and secrete chitinase as the result of the introduction of foreign DNA linked to a sequence encoding chitinase, an enzyme capable of degrading chitin present in fungi and nematodes. Novel plants that are resistant to cold damage are also described which are created by introduction of DNA encoding for the production of chitinase. The plants of the invention may also have enhanced levels of reducing sugars or sweetness, or produce fruit having enhanced levels of reducing sugars or sweetness, or may be selected for enhanced post-harvest storage life.

25 Claims, 4 Drawing figures

Exemplary Claim Number: 9

Number of Drawing Sheets: 4

---------- KWIC ---------

Detailed Description Text - DETX (25):

The present invention can also be used in combination with the introduction of some other foreign DNA, that is foreign DNA other than **chitinase** DNA, into a bacteria or plant. For instance, in the case of rhizobacteria, such other foreign DNA could provide the host with some other form of anti-pathogen activity or with some other means to allow it to enhance the soil environment to the benefit of the plant. Another example is the introduction into a plant cell of a foreign gene attached to the nucleotide sequence encoding the signal peptide sequence of the **chitinase** A gene. Such foreign genes for introduction into a plant cell could be from a variety of sources (e.g., bacterial, plant, **mammalian,** yeast or fungal) and from a number of classes of genes, e.g., genes to protect plants against pathogens (including **antifungal** genes, e.g., cecropia, magainin, attacins or lysozymes); genes to protect plants against environmental stresses (such as antifreeze genes and salt tolerance genes); and genes to allow plant cells to produce desired pharmaceutical or other peptides, in particular where the peptide is to be overproduced for collection and purification (such as genes for growth hormones or insulin). The expressed polypeptide will then be released into the environment.

US-PAT-NO: 5538525

DOCUMENT-IDENTIFIER: US 5538525 A
See image for Certificate of Correction

TITLE: Biocidal proteins

DATE-ISSUED: July 23, 1996

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Broekaert; Willem F.	Dilbeek	N/A	N/A	BE
Cammue; Bruno P. A.	Alsemberg	N/A	N/A	BE
Osborn; Rupert W.	Middlesex	N/A	N/A	GB2
Rees; Sarah B.	Berkshire	N/A	N/A	GB2
Terras; Franky R. G.	Amzegem	N/A	N/A	BE
Vanderleyden; Jozef	Heverlee	N/A	N/A	BE

APPL-NO: 08/ 377687

DATE FILED: January 25, 1995

PARENT-CASE:

This is a continuation of application No. 08/002,480, filed as PCT/GB92/01570 Aug. 27, 1992, which was abandoned upon the filing hereof.

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
GB	9118523	August 29, 1991

US-CL-CURRENT: 514/2, 514/12 , 530/324

ABSTRACT:

Biocidal proteins isolated from seeds have been characterised, in particular proteins isolated from members of the Brassicaceae, Compositae and Leguminosae families including Raphanus, Brassica, Sinapis, Arabidopsis, Dahlia, Cnicus, Lathyrus and Clitoria. The proteins show a wide range of antifungal activity and some are active against Gram-positive bacteria. All share a common amino acid sequence. DNA encoding the proteins has been isolated and incorporated into vectors. Plants transformed with this DNA may be produced. The proteins find commercial application as antifungal or antibacterial agents; transformed plants will show increased disease-resistance.

14 Claims, 42 Drawing figures

Exemplary Claim Number: 1,14

Number of Drawing Sheets: 39

---------- KWIC ---------

Brief Summary Text - BSTX (8):

These proteins have gained considerable attention as they could potentially be used as biocontrol agents. The **chitinases** and beta-1,3-glucanases have weak activities by themselves, and are only inhibitory to plant pathogens when applied in combination (Mauch et al, 1988, Plant Physiol, 88,936-942). The chitin-binding lectins can also be classified as rather weak **antifungal** factors (Broekaert et al, 1989, Science, 245, 1100-1102; Van Parijs et al, 1991, Planta, 183, 258-264). Zeamatin is a more potent **antifungal** protein but its activity is strongly reduced by the presence of ions at physiological concentrations (Roberts and Selitnermikoff, 1990, G Gen Microbiol, 136, 2150-2155). Finally, thionins and ribosome-inactivating proteins are potentially hazardous since they are known to be toxic for **human** cells (Carrasco et al, 1981, Eur J Biochem, 116, 185-189; Vernon et al, 1985, Arch Biochem Biophys, 238, 18-29; Stirpe and Barbieri, 1986, FEBS Lett, 195, 1-8).

US-PAT-NO: 5521153

DOCUMENT-IDENTIFIER: US 5521153 A

TITLE: Synergistic antifungal protein and compositions containing same

DATE-ISSUED: May 28, 1996

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Roberts; Walden K.	Denver	CO	N/A	N/A
Selitrennikoff; Claude P.	Evergreen	CO	N/A	N/A
Laue; Bridget E.	Davis	CA	N/A	N/A
Potter; Sharon L.	Raleigh	NC	N/A	N/A

APPL-NO: 08/ 178708

DATE FILED: January 10, 1994

PARENT-CASE:

This Application is a continuation-in-part application of U.S. application Ser. No. 07/505,781, filed Apr. 6, 1990, which is a continuation-in-part Application of U.S. application Ser. No. 07/104,755 filed Oct. 2, 1987, both now abandoned. Such applications are herein incorporated by reference .

US-CL-CURRENT: 514/2, 514/12 , 514/8 , 530/372 , 530/376

ABSTRACT:

Novel plant proteins (SAFPs) which synergize the activity of antifungal antibiotics are identified. SAFPs are demonstrated to synergize antifungal antibiotics, such as nikkomycins, polyoxins and amphotericins. SAFPs alone also display antifungal activity against several species of fungi, including strains of Candida, Trichoderma, Neurospora and strains of the plant pathogens Fusarium, Rhizoctonia and Chaetomium. Synergistic antifungal compositions containing SAFP and antifungal antibiotics are provided. In particular, synergistic compositions of corn-SAFP (zeamatin), sorghum-SAFP (sormatin) or oat-SAFP (avematin) and nikkomycin are found to be effective as antifungal compositions, especially against the opportunistic human pathogen Candida albicans. Method for employing SAFPs and synergistic compositions containing them for the inhibition of fungi are provided. In addition, a method for purifying SAFP from grain meal is provided.

15 Claims, 13 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 10

---------- KWIC ---------

Detailed Description Text - DETX (4):

The present work is an extension of experiments with **antifungal** proteins (AFPs) which were isolated from barley, corn and wheat (Roberts and Selitrennikoff (1988) J. Gen. Microbiol. 134:169-176). These proteins inhibited growth of Trichoderma, Phycomyces and Alternaria and have been shown to have endochitinase activity. Wheat and barley AFP **chitinases** did not inhibit growth of Neurospora, in contrast to corn AFP preparations. Growth of the important **human** pathogen Candida albicans was found to be resistant to inhibition by the AFPs in agar plate assays. AFPs were then assessed to determine if they synergized with **antifungal** antibiotics to lower the MICs of the antibiotics. Selected results of such experiments are summarized in Table 1. Nikkomycin, a mixture of nikkomycin Z and X, synergized with all AFP preparations, but synergy was particularly dramatic with corn-AFP preparations. Polyoxin synergized significantly with corn and wheat AFP preparations, while modest synergy was observed with combinations of amphotericin and AFP preparations from barley and corn. In contrast; no synergy was observed with papulocandin and AFP preparations. Wheat and barley AFPs (Table 1) were purified to homogeneity. The corn-AFP preparation (Table 1) when chromatographed through a CM-Sephadex.TM. column was shown to contain multiple protein peaks (FIG. 1). Using synergy with nikkomycin to inhibit the growth of C. albicans as an activity assay, the synergizing activity in corn-AFP preparations was found to reside in a single protein fraction from CM-Sephadex.TM. column chromatography, see FIG. 1. Further purification of this fraction using conventional hydrophobic column chromatography with phenyl-Sepharose.TM. resulted in the isolation of an approximately 22 kd protein. The 22 kd protein which effected strong enhancement of nikkomycin activity was designated a corn-SAFP, and specifically named zeamatin.

US-PAT-NO: 5374540

DOCUMENT-IDENTIFIER: US 5374540 A

TITLE: Chitinase-producing bacteria and plants

DATE-ISSUED: December 20, 1994

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Suslow; Trevor	El Cerrito	CA	N/A	N/A
Jones; Jonathan D. G.	Norwich	N/A	N/A	GB

APPL-NO: 07/ 550253

DATE FILED: July 9, 1990

PARENT-CASE:

BACKGROUND OF THE INVENTION

This application is a continuation-in-part of pending application U.S. Ser. No. 06/888,033, filed Jul. 18, 1986, now U.S. Pat. No. 4,940,840, which is a continuation-in-part of U.S. Ser. No. 06/593,691, filed Mar. 26, 1984, which issued as U.S. Pat. No. 4,751,081 NOVEL CHITINASE-PRODUCING BACTERIA, both in the names of Trevor V. Suslow and Jonathan D. G. Jones. Both of the above are incorporated herein by reference.

US-CL-CURRENT: 435/69.8, 435/320.1 , 435/414 , 435/419 , 435/69.7 , 435/70.1

ABSTRACT:

Novel bacteria strains and plants are described which produce and secrete chitinase and other proteins as the result of the introduction of foreign DNA linked to a sequence encoding chitinase, an enzyme capable of degrading chitin present in fungi and nematodes. The bacterial strains have utility in producing chitinase for the purpose of inhibiting plant pathogens. Novel pathogen resistant plants are also described which are created by introduction of DNA encoding for the production of chitinase.

21 Claims, 6 Drawing figures

Exemplary Claim Number: 11

Number of Drawing Sheets: 6

---------- KWIC ---------

Detailed Description Text - DETX (23):

The present invention can also be used in combination with the introduction of some other foreign DNA, that is foreign DNA other than **chitinase** DNA, into a bacteria or plant. For instance, in the case of rhizobacteria, such other foreign DNA could provide the host with some other form of anti-pathogen activity or with some other means to allow it to enhance the soil environment to the benefit of the plant. Another example is the introduction into a plant cell of a foreign gene attached to the nucleotide sequence encoding the signal peptide sequence of the **chitinase** A gene. Such foreign genes for introduction into a plant cell could be from a variety of sources (e.g., bacterial, plant, **mammalian,** yeast or fungal) and from a number of classes of genes, e.g., genes to protect plants against pathogens (including **antifungal** genes, e.g., cecropin, magainin, attacins or lysozymes); genes to protect plants against environmental stresses (such as antifreeze genes and salt tolerance genes); and genes to allow plant cells to produce desired pharmaceutical or other peptides, in particular where the peptide is to be overproduced for collection and purification (such as genes for growth hormones or insulin). The expressed polypeptide will then be released into the environment.

US-PAT-NO: 5290687

DOCUMENT-IDENTIFIER: US 5290687 A

TITLE: Chitinase-producing bacteria and plants

DATE-ISSUED: March 1, 1994

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Suslow; Trevor	El Cerrito	CA	N/A	N/A
Jones; Jonathan D. G.	Norwich	N/A	N/A	GB

DISCLAIMER DATE: 20070710

APPL-NO: 07/ 930970

DATE FILED: August 14, 1992

PARENT-CASE:

This application is a continuation of pending U.S. application Ser. No. 07/550,253, filed Jul. 9, 1990, which is a continuation-in-part of U.S. Ser. No. 06/888,033, filed Jul. 18, 1986, which issued as U.S. Pat. No. 4,940,840, which is a continuation-in-part of U.S. Ser. No. 06/593,691, filed Mar. 26, 1984, which issued as U.S. Pat. No. 4,751,081, all in the names of Trevor V. Suslow and Jonathan D. G. Jones, all of which are incorporated herein by reference.

US-CL-CURRENT: 435/69.1, 435/70.1 , 800/279 , 800/301

ABSTRACT:

Novel bacteria strains and plants are described which produce and secrete chitinase and other proteins as the result of the introduction of foreign DNA linked to a sequence encoding chitinase, an enzyme capable of degrading chitin present in fungi and nematodes. The bacterial strains have ut

This invention was made with Government support under Grant No. 1S1-8560311 awarded by the National Science Foundation. The Government has certain rights in this invention.

12 Claims, 6 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 6

---------- KWIC ---------

Detailed Description Text - DETX (23):

The present invention can also be used in combination with the introduction of some other foreign DNA, that is foreign DNA other than **chitinase** DNA, into a bacteria or plant. For instance, in the case of rhizobacteria, such other foreign DNA could provide the host with some other form of anti-pathogen activity or with some other means to allow it to enhance the soil environment to the benefit of the plant. Another example is the introduction into a plant cell of a foreign gene attached to the nucleotide sequence encoding the signal peptide sequence of the **chitinase** A gene. Such foreign genes for introduction into a plant cell could be from a variety of sources (e.g., bacterial, plant, **mammalian**, yeast or fungal) and from a number of classes of genes, e.g., genes to protect plants against pathogens (including **antifungal** genes, e.g., cecropin, magainin, attacins or lysozymes); genes to protect plants against environmental stresses (such as antifreeze genes and salt tolerance genes); and genes to allow plant cells to produce desired pharmaceutical or other peptides, in particular where the peptide is to be overproduced for collection and purification (such as genes for growth hormones or insulin). The expressed polypeptide will then be released into the environment.